

# FLIGHT

The  
AIRCRAFT ENGINEER  
AND AIRSHIPS

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A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport

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## CONTENTS

	PAGE
Editorial Comment	153
Aerial Defence in France	154
Air Exercises	156
Falcon IV	157
Baker Wind Indicator	157
All-Metal Airships	158
Airport News	160
Private Flying	161
Gliding	163
Air Transport	166
Airships from the Four Winds	167
Some Irvin Airchute Statistics	168
Calculation of Aircrew Characteristics	170
Air Ministry Notices	170
The Design of Service Aeroplanes	171
In Parliament	171
Models	172

## EDITORIAL COMMENT



THE position of service aeronautics in France is not easy to understand. The Republic has an Air Ministry, with our good friend, Sir Laurent Eynac, G.B.E., at its head. But it has no Air Force in the sense in which Great Britain has one. France retains a military flying corps and a naval flying corps, the former naturally being much the larger and more important. To what extent these two branches of the two fighting services were under the control of a civilian Air Minister was never quite clear to us on the north of the English Channel. One could hardly expect Sir Laurent to be an authority on military co-operation and also on naval co-operation. He is, we understand, an authority on technical development and on civil flying, and on air matters generally; but the fighting services require special knowledge of their needs, and this knowledge can only become indirectly available to a civilian.

Evidently, the short-comings of the recent system have been realised, for Marshal Pétain has been appointed Inspector-General of Aerial Defence. It seems that the Ministry for Air co-operated with the Ministries for War and Marine in requesting that steps should be taken to co-ordinate the air defences of the country. We may, therefore, conclude that the new arrangement is, at the least, not unwelcome to Sir Laurent Eynac. What is rather puzzling to us is the statement that the Marshal is to have complete control of all branches of air defence, including *personnel* and *matériel*. There seems little left for the Air Minister to control except civil flying, which is scarcely a full-time job for a Minister.

Marshal Pétain is the greatest surviving commander of the great war. There have always been authorities who held him to be a greater soldier than was the late Marshal Foch. It is natural that France, when selecting one man to be head of her aerial defences should have chosen a soldier. France must always be primarily a military nation, even though her navy also needs to hold a front-rank position. It

## DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1931	
Feb. 21	Rugby Football R.A.F. v. Navy at Twickenham.
Feb. 25	"Land and Air Defence Forces of Australia," R.U.S.I. Lecture, by Maj.-Gen. J. H. Bruche, 3 p.m.
Feb. 26	"Meteorological Aspects of Gliding and Soaring," Lecture, by Capt. F. Entwistle, before R.Ae.S. and B.G.A.
Feb. 26	"Latest Aircraft Instrument Developments," Lecture, by Maj. C. J. Stewart, before Westland Aircraft Soc.
Feb. 26	"Motor Fuels and Modern Methods of Testing," Lecture, by Anglo American Oil Co., Ltd., before R.Ae.S. (Glos. and Chelt.).
Feb. 27	"Aircraft Light Alloys," Lecture, by H. Sutton, before R.Ae.S., Hull.
Feb. 27	British Gliding Association Annual General Meeting.
Mar. 4.	"Meteorology and Air Navigation," R.U.S.I. Lecture, by Lt.-Comdr. J. W. Josselyn, 3 p.m.
Mar. 5	"Mechanical Testing of Aircraft Materials," Lecture, by L. W. Nethercott, before R.Ae.S. (Glos. and Chelt.).
Mar. 7	Sailplane Club and Model Aircraft Club Joint Dance at Suffolk Galleries
Mar. 12	"Metals," Lecture, by W. J. Norton, before Westland Aircraft Soc.
Mar. 14	Opening of British Empire Trade Exhibition, Buenos Aires.
Mar. 14	Association Football: R.A.F. v. Army.
Mar. 19	"Research in the Berlin Technische Hochschule," Lecture, by Dr. W. Hoff, before R.Ae.S.
Mar. 19	"Care and Maintenance of Engines," Lecture, by K. Smith before R.Ae.S. (Glos. and Chelt.).
Mar. 25	R.Ae.C. Annual General Meeting.
Mar. 27	"Flying of High Speed Seaplanes," Lecture, by Sqdn.-Ldr. A. H. Orlebar, before R.Ae.S., Hull.
Mar. 28	Association Football: R.A.F. v. R.N. & R.M., Millwall.
Mar. 28	Rugby Football: R.A.F. v. Army at Twickenham, 3 p.m.
April 16	"Aircraft Noise," Lecture, by Dr. A. H. Davis, before R.Ae.S.

is doubtless for that reason that France has never instituted a separate air force. One of her greatest problems must always be to ensure that her air escadrilles give the best possible support to the strategic movements of her troops—not merely by what we understand as co-operation with artillery, infantry, and cavalry, but a general, comprehensive co-ordination of air effort with ground effort. In brief, the escadrilles have to function in the same way as the R.F.C. functioned in France up to April 1, 1918. Even after that date, we must remember that the Independent Air Force was under the general command of Marshal Foch, though it was not under Field-Marshal Lord Haig.

We must imagine that it will lie with Marshal Pétain to lay down the services which it is necessary for the escadrilles to render to the army, and for Sir Laurent Eynac to see that aeroplanes are provided which are capable of performing those services. But we must remember that in the event of another war, the air services will be fighting while the ground troops are still mobilising and deploying. For the best employment of the fighters and bombers during that period it would seem that an air staff is necessary. Doubtless it will be Marshal Pétain's first task to collect such a staff round him. That would almost seem to suggest that it would be best for France to copy Great Britain straight away and have a separate air force. But the positions are not the same, for we have to defend a sea frontier, and France has to defend a land frontier. We have never been able to decide definitely where the defence duties of the Royal Navy end and where those of the Army begin. Therefore we are wise to have an Air Force which soars above such disputatious matters; while France may be equally wise to regard her air problem as entirely a branch of military defence. We shall watch developments in France with sympathetic interest.



It is announced that Air Exercises will be held this year in the third or fourth week in July, so that we shall just have time to recover from them before plunging into the excitement of the final preparations for the Schneider Contest. We welcome the announcement, for it is undoubtedly a good thing for the minds of the public to be kept full of air interests throughout the summer. Apart from that, Air Exercises are very welcome for their own sakes. Their chief function is to teach lessons to the Air Staff about the working of equip-

#### Air Exercises

ment, organisation, and plans of campaign. They also serve the very useful purpose of giving a chance to the Press and the public to study questions of air defence. We must admit that a large section of the Press makes very poor use of the opportunities thus afforded. To some papers everything which happens in the air is either a "stunt," or must be represented by ingenious reporters as a "stunt." Serious lessons concerning the working of, say, the information provided by the corps of coast watchers, has less "news value" than a supposititious blotting out of the Air Ministry with heavy bombs.

These papers, and the public which reads them, care chiefly about tallies of the number of bombs which theoretically have been dropped in the defended area, and care nothing for the casualties inflicted on the raiders as they try to fight their way back home. Yet, as it is freely admitted that complete immunity from air attack cannot be guaranteed to any given spot, the toll taken of the raiders even on their return is of the utmost importance. General Ashmore has shown in his book on Air Defence that while we could not absolutely prevent the Gothas from reaching London, we did ultimately put a stop to the raids by shooting down so many that the game was finally reckoned not worth the candle. Still, despite the ways of the sensational Press, the Air Exercises do give opportunities to serious-minded students of the subject, and that is a very good thing.

This summer we hope to see the interceptor fighter at work, and to have an opportunity of studying its effect. Unfortunately, there are not likely to be a considerable number of "Fury" machines in the air, and it is proverbially unwise to draw too many conclusions from the presence of one swallow—or any other kind of flying thing. None the less, it will be interesting to get some idea of how the Commander-in-Chief intends to use the interceptor. Will the "Fury" be stationed on the coast aerodromes in the hope of catching the raiders before they get inland, or will it be placed further back, so as to benefit by fuller information of the course of a raid before it takes off to attack it? Will its speed and climb compensate for its comparatively short endurance, or will the all-round performance of the "Bulldog" prove ultimately more useful? To test out these problems will need considerable experience, and it will also need a more ample supply of "Harts" than is at present available. Though final conclusions may not be drawn this year, the first indications will be intensely interesting to observe.



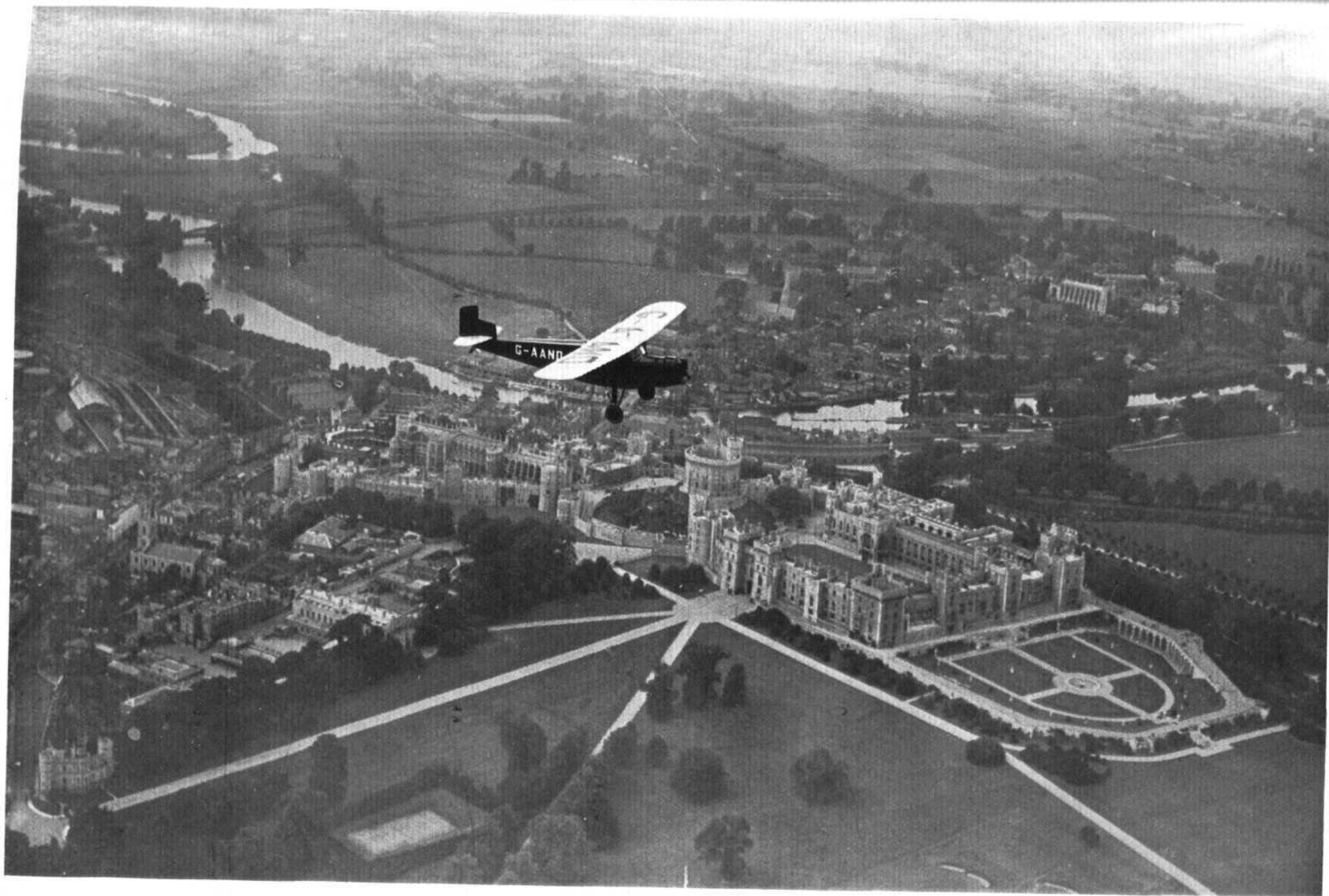
#### Greeting the New D.C.A.

LADY ELIBANK and the British Aviation Hospitality Association held a very pleasant little gathering at the International Sportsmen's Club, Upper Grosvenor Street, London, on Monday evening, February 16, to greet Lieut. Col. F. C. Sheldermine, O.B.E., who has just returned from India to take up the post of Director of Civil Aviation at the Air Ministry. Lord and Lady Elibank received the guests, among whom were Lord Amulree and Mr. Montague, the Air Minister and his Under Secretary. Col. Sheldermine evidently enjoyed the evening, for he said it was the first time he had been reasonably warm since he had landed in England. Doubtless he had other reasons as well for enjoying it, and these were shared by all the other guests.

#### The London Aeroplane Club

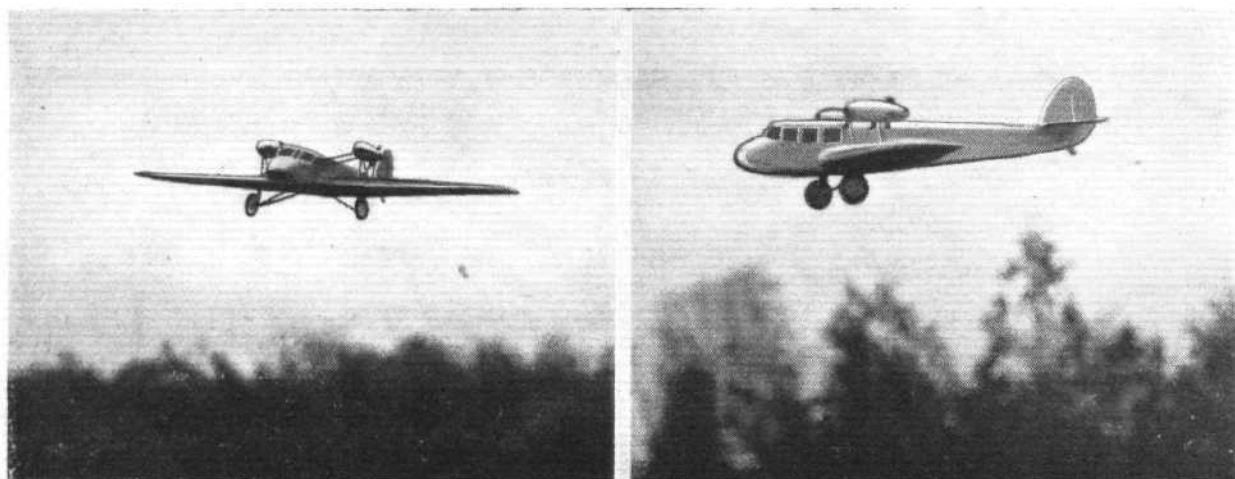
THE London Aeroplane Club's annual dinner and dance was held at the Park Lane Hotel, Piccadilly, on Tuesday evening, February 17. It has become almost traditional

that the London Aeroplane Club dinner should be one of the most attractive functions of such nature each year, and those at Tuesday night's gathering had no cause to complain that this tradition was not justified. Over 350 people were present and this number was increased later by those who were unable to come to the dinner itself, but who came along for the dance afterwards, and the general consensus of opinion was that it was the most enjoyable dance anyone had had for a very long time. Lt.-Col. Sheldermine was present and acted as judge for the draw, which is now held annually by the club for three aircraft. Incidentally, this must be the first function, other than his welcome on Monday evening, which he has attended since taking over his duties as D.C.A. There was great excitement over the draw, and the final result was: ticket No. 2007, held by Miss R. E. Balfour, drew the Puss Moth (Gipsy III); ticket No. 3373, Capt. Leighton-Davies, drew a Moth (Cirrus II); and ticket No. 1665, Mr. Brian Lewis, drew another Moth (Cirrus II).



ABOVE WINDSOR CASTLE: A remarkable view of the Castle with the River Thames in the background. The machine is a Hermes-engined Desoutter belonging to National Flying Services. (FLIGHT Photo.)





THE "FALCON FOUR": Two views showing the machine in flight. The engines are Hermes II's. The machine is being built to the order of the Hon. Mrs. Freeman-Thomas.

## THE "FALCON FOUR"

### A New and Interesting Twin-Engine Four-Seater

THOSE who have come to the conclusion that aircraft design, particularly in the private owner's class, has reached stagnation point, are apt to change their view during the coming spring and summer. Several new types are coming along, and among them are several which are quite unusually interesting.

By the courtesy of the owner, FLIGHT is able this week to publish brief particulars of one of these new aircraft, which is now in course of construction, and which promises to "strike a new note" in the design of aircraft for the private owner. The machine, which is to be known as the "Falcon Four," has been designed by Mr. Basil B. Henderson, of Shoreham, and is being built by Mr. Miles, of Southern Aircraft, Ltd., also of Shoreham Aerodrome.

Mr. Henderson, it will be recollected, already has to his credit two very successful designs: the "Hendy Hobo" and the "Hendy 302." Both these machines incorporate a type of wing construction patented by Mr. Henderson, which is especially suitable for cantilever monoplanes, and the chief feature of which is great torsional strength, so that wing flutter is practically impossible. This type of wing construction is being used in the "Falcon Four," and there is no reason to doubt that it will be successful in that machine as it has been in the previous types.

Mr. Miles has gained fame as the producer of the "Martlet," a little single-seater with a perfectly amazing performance, and the collaboration of Miles and Henderson in the production of the new machine should be sufficient guarantee that the machine will be in every way a sound job in spite of its novel design.

The "Falcon Four" is a low-wing, twin-engined cantilever monoplane designed to carry pilot and three passengers. In a general way it may be said to represent the translation of flying-boat practice into landplane design. The engines are placed high above the wing, giving a higher thrust line than is usually met with in land planes, but not, it would seem, any higher than frequently employed without ill-effects in flying boats. The adoption of this engine placing has a number of advantages, and these are increased by the fact that the "Cirrus-Hermes II" engines are being installed as "pushers." This placing of the engines has only been made possible by the research work carried out by Cirrus

Aero Engines, Ltd. That work is, we understand, still going on, but enough has already been ascertained to indicate that cooling of the engines should present no insuperable difficulties. This is to be heartily welcomed as a piece of very real progress, for there can be no doubt that the "pusher" type of aircraft has a number of advantages, and once the cooling problem has been overcome we are sure that several "pusher" types will be produced.

In the "Falcon Four," the two "Hermes II" engines are placed on stilts above the wing, and located fairly far back. By so doing, it has been found possible to move the occupants fairly far forward, so that the cabin lies mainly ahead of the wing, with the result that the view from all four seats is exceptionally good. A further advantage is that the airscrews are well out of the way, so that passengers can enter and leave the machine while the airscrews are running without fear of being struck (the door is ahead of the wing).

Another result of placing the engines as far back as possible is that the amount of noise which reaches the cabin is considerably reduced, while the use of a clever shock absorber system in the engine struts and wing attachments reduces to vanishing point the vibration transmitted to the cabin. The machine is designed for a cruising radius of 600 miles at 100 m.p.h., and as this duration is above the average, the comfort of the occupants is an item which has to be studied carefully. In the "Falcon Four" comfort is, in fact, the keynote of the design. Engine starters are fitted, so that the engine can be started from the cabin by pressing a button.

Structurally, the new machine is of all-wood construction, and fabric is used for the wing covering.

The wide-track undercarriage has low-pressure tyres and independently-operated wheel brakes, while a tracking air-wheel takes the place of the usual tail skid.

Finally, it should be mentioned that the two photographs which illustrate these notes, and which might convey the impression that the machine is already finished and flying, show a scale model of the "Falcon Four," cleverly suspended in front of a hedge to give the impression of a machine coming in over the treetops.

When the machine is finished and has completed its initial flying tests, we hope to publish a more detailed description.

#### A Step in the Right Direction

It will be remembered that we have constantly advocated a serious view being taken of the contraventions of the ordinary regulations by private owners, and the London Club has now taken action in a manner which leaves no doubt that they are of the same opinion. A complaint was made to the Air Ministry of low flying of one of the club aircraft over Wandsworth Common on Sunday, January 18, and after investigation of the complaint by the Committee of the club, Mr. G. P. Harper has been suspended from flying club aircraft for three months, dating from January 28. We sincerely hope that they will continue to impress upon all their members the need for flying in a manner which will in no way

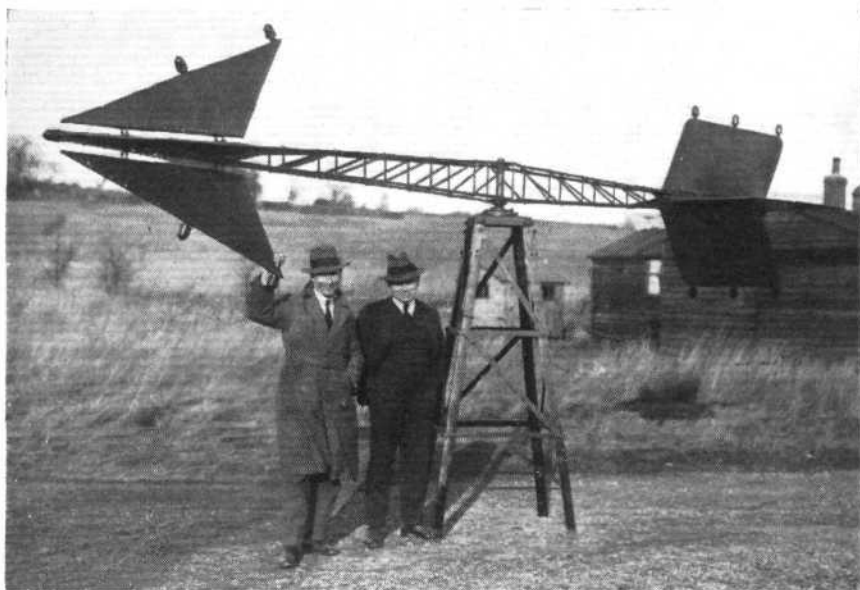
increase ill-feeling between aviators in general and the public on the ground. It was recently reported in the daily papers of a young lady who considered that she knew better how to handle her machine than did those older than herself and took off from a south coast aerodrome when half a gale was blowing, and when night was falling rapidly, with the result that by the time she reached the outskirts of London, darkness had already fallen and flares had to be laid out to assist her landing at her north London destination. It is flying like this which if persisted in will do irreproachable harm to aviation in general and must now at the outset be rigorously kept down.

## A NEW WIND DIRECTION INDICATOR

THE old "wind stocking" is a useful aid to the pilot coming in to land or about to start, but at night, its usefulness ceases. "Landing Tees" are usually big and cumbersome affairs, which cannot easily be mounted on roofs or towers. A new type of wind indicator, for use by night as well as by day, has just been brought out by Mr. Martin, of the Martin Aircraft Works, Higher Denham, Middlesex. Mr. Martin has produced, in collaboration with Captain Baker, the chief instructor at Heston, a novel design of aeroplane which will make its appearance in the spring, and the new wind direction indicator was built at the Martin aircraft works.

The indicator consists of a steel framework with an arrow-head at one end and "feathers" at the other. The indicator is mounted on Hoffmann ball-bearings, and a damping device is incorporated to prevent "hunting." The indicator incorporates an ingenious device by which, when the wind drops to zero, the arrow automatically returns to some predetermined position, so that in a calm, pilots may land in the direction most suitable to the particular aerodrome.

The whole "arrow" is quite light, and may be mounted either on a small lattice tower on the ground, or on the roof of a hangar or other convenient high point. Electric bulbs are provided on arrowhead as well as tail, four on the former and six on the latter. For use on the top of towers, the



"fuselage" of the indicator is hinged in the centre, so that when an electric bulb has to be replaced, etc., the body is folded around its hinge, and the lights can be reached in comfort.

The Martin indicator should become popular for all aerodromes where occasional night flying is done.

## THE ALL-METAL AIRSHIP

AS our readers may be aware, some experiments have been carried out in America with all-metal airships. One of these, which apparently has met with a certain amount of success, is the small airship ZMC-2, produced by the Aircraft Development Corporation of Detroit for the U.S. Navy in 1929. This airship—which was purely experimental, to try out the results of five years' research on the problem of all-metal construction for airships—was completed in August, 1929, and the following month successfully completed its flying tests at Lakehurst.

The ZMC-2 is of 200,000 cub. ft. capacity, having a length of 149 ft. 5 in. and a maximum diameter of 52 ft. 8 in. Its covering consists of 0.0095-in. thin Alclad alloy sheets sewn together by the Aircraft Development Corporation riveting machine in a series of rings. Each of these rings has the shape of the frustum of a cone, and together closely approximate the curvature of the hull; there are 142 such conical surfaces from bow to stern.

This covering in turn is riveted to a supporting structure built up of transverse frames and longitudinals, and as it forms the envelope of the airship, the seams of the sheet covering have to be made gas-tight. This is achieved by a gas-sealing compound which is applied on the seams.

We hope to give fuller details of this airship on another occasion, but meanwhile it may be of interest to record that—apparently as a result of the trials with the ZMC-2—the U.S. House of Representatives has made an initial appropriation of \$200,000 for the construction of a \$4,500,000 metal-clad airship for the U.S. Army. Experimental and engineering work on this airship will start immediately, and the following is a report—and by no means a pessimistic one!—issued by the Detroit Aircraft Corporation.

"The new dirigible will be slightly larger than the *Graf Zeppelin*, but will have a higher speed. It will be particularly designed to act as an air tender for a large fleet of airplanes, being equipped with devices which will allow 'planes to attach themselves to the ship while refuelling and changing crews. By this method it will be possible for the dirigible to convey a fleet of bombing or observation 'planes thousands of miles, or even across the ocean, without touching land. Equipped with eight motors of between 600 and 800 h.p. each, the airship will have a top speed of 100 miles an hour. Sufficient fuel and other supplies will be carried to allow the ship to remain away from its base on a slow bombing or observation mission for 22 days without contact with any outside source of supply.

"Carrying a crew of approximately 40 men, with com-

fortable sleeping and day accommodation for an additional number of passengers, kitchens, lounging and smoking rooms, the ship will have little outward evidence of its tremendous potential destructive power in time of war.

"Provision is made for carrying a useful load of 40,000 lb. not including the weight of fuel, and supplies necessary for operation of the ship. If this load were made up of bombs, torpedoes, and other military equipment, it is estimated that several cities the size of New York could be seriously damaged in a single raid. Figured at a cost of \$4,500,000 each, nine of these battleships of the air could be produced for the price of a single battleship of the present type.

"While designed primarily for military purposes, the dirigible can also be used as a commercial carrier, for transportation of passengers, freight and supplies, and it is believed the construction of this ship will be the forerunner of the establishment of transatlantic and other long-distance dirigible service.

"The new ship will be of entirely different construction from any dirigible of practical size now in existence, but of the same type as the experimental ship built by the Detroit Aircraft Corporation for the Navy in 1929. Instead of the usual highly inflammable fabric covering, it will be covered with a new metal called Alclad, one of the lightest and strongest metals yet discovered. A large part of the stress is carried in the metal shell of the ship, which is further reinforced by sturdy metal circular rings and longitudinal members.

"Helium gas will be used for lifting power, which further reduces the possibility of fire or explosion.

"The shell of the ship itself will act as the gas container, but this will be partitioned to prevent loss of enough lifting power to effect operation, should the ship be hit by gunfire from the ground or from the air.

"It is claimed that this type of construction, which has been thoroughly tested on the smaller metal-clad dirigible, the ZMC-2, will make the ship strong and fast enough to survive any storm, lower maintenance costs, and have other advantages.

"While the initial appropriation of \$200,000 will not provide enough money to start actual construction of the ship, it is hoped that Congress will appropriate additional amounts for construction purposes should the details of the design be approved by the Army. Construction and engineering will take approximately three years, making the ship ready for service in 1935."

[We have a few more years to live, at any rate.—Ed.]



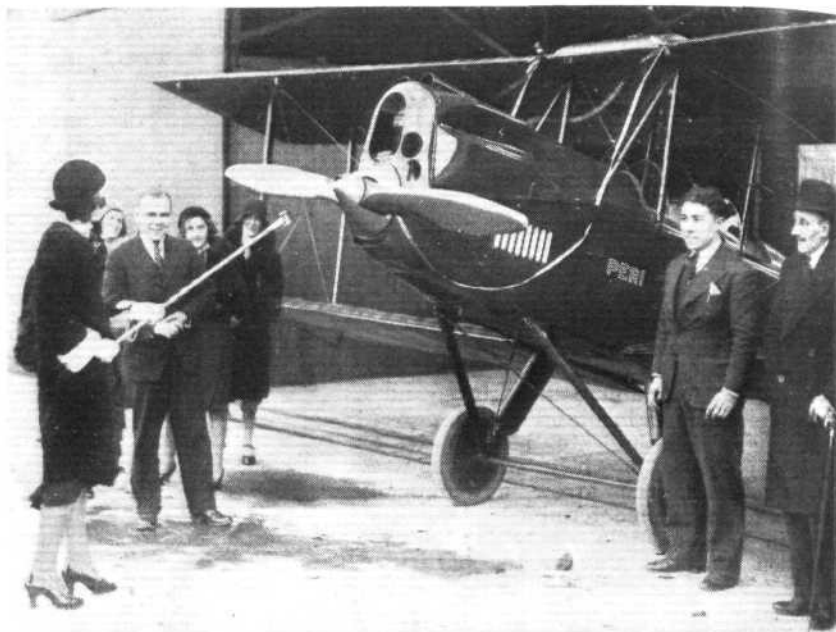
# AIRPORT NEWS

## AT HESTON

**H**ESTON was the scene of a wicked waste of champagne on Thursday afternoon, February 12, when Mrs. J. C. C. Taylor broke a bottle of this valuable liquid on the nose of the B.P. Company's new sports Avian (Hermes II). Mrs. Taylor is the wife of Capt. Joe Taylor the well-known aviation manager of the B.P. Company, and both he and Mr. H. Rhodes have recently retaken their "A" licences at the Heston School, and will now be seen on their companies' business in this, their latest vehicle. The machine itself—which, by the way, was obtained through the agency of the Brooklands School of Flying—is one of the very latest sports Avians, and is certainly the prettiest light aircraft we have seen. The fuselage and the leading edge of the wings is a rich green with gold registration lettering, while the wings, struts, and tail surfaces are gold. It has the new wings with 30-ft. span, which give the machine an extremely low landing speed and puts the total permissible weight for C. of A. up to 1,850 lb. The engine is, of course, mounted on the now standard rubber feet, which make it run very smoothly, and the whole makes a very attractive machine with a high cruising speed. It is rather interesting to notice that every petrol company now has a sports Avian, since the Shell Company are shortly taking delivery of a new one.

The B.P. Company are the latest of the "petrol combine" to start running a machine of their own, for both the Shell and Pratts Companies already have three machines each. The former has a Puss Moth (Gipsy III), a Moth (Hermes) and a sports Avian (Hermes II), while the latter has a Widgeon (Gipsy I) and two sports Avians (Hermes II).

The christening ceremony itself was attended by Mr. J. D. Ellis, Mr. Percy Coombes, Mr. H. J. German, Mr. I. B. Boyce, Mr. J. D. Kelly, Capt. A. B. Rogers, Mrs. C. W. Wimbury and daughter, Mr. and Mrs. Norman Woods, Mr. and Mrs. W. Norman, besides representatives of the aviation press and others; and after Mrs. Taylor had whetted their appetites by anointing the machine, the guests were entertained to tea and other refreshments in the club lounge. Mr. B. S. Allen, of Henlys, who hold the agency for Avians, together with his recently acquired assistant Mr. Stace, was much in evidence, and was heard to remark that he hoped all firms using aircraft for their representatives would shortly be following the B.P. Company's example!



**THE FATAL STROKE!** Mrs. Taylor photographed just after striking the fatal blow! Mr. Allen, of Henly's, evidently thinks his aircraft worth such an anointing. (FLIGHT Photo.)

## CROYDON WEEKLY NOTES

**T**HE beginning of the week under review, did not present very great hopes for many interesting events, as gales and rain made flying a pretty strenuous occupation and the pilots on the regular services had some very trying trips. All were unanimous in their verdicts that one journey in such weather was quite sufficient. However, let it be recorded to their credit they all battled with the elements and the services were maintained. Some very spectacular landings were made, and had it not been for the skill of the pilots concerned, there would most certainly have been a few machines on the sick list. One can recall previous occasions when the elements have beaten the skill of the pilots when landing in gales.

Miss Amy Johnson caused some consternation on Tuesday evening, when after arriving at Lympne, from Hanover, she decided to fly on to Stag Lane, in the teeth of the gale that was raging. Croydon, of course, was standing by with all illuminations, in case she should have to land. After being an hour out from Lympne, some anxiety was felt owing to lack of any further news, especially as a little earlier a Moth had



**AFTER THE BAPTISM:** The B.P. Co.'s new Avian (Hermes II) ready for business. (FLIGHT Photo.)

**THE "FLYING CARPET":** Two Americans, from California, Moya Stephens and Richard Halliburton, are carrying out a tour round the World in this Spearman biplane, fitted with a Wright "Whirlwind" engine. They arrived in this country with their machine, by boat, last week and flew to Heston Air Park on February 10. It is probable that they will resume their tour from Heston today—Friday—and they expect to complete their journey in two years. (FLIGHT Photo.)



landed at Croydon and got into extreme difficulties. It was by the most amazing luck that it was not smashed to matchwood. However, Amy did eventually reach Stag Lane after dark, and one must admire her pluck, but one would not recommend to most private owners, trying the same thing in the same sort of weather. I doubt whether a good many of our professional pilots would have attempted a flight through a gale like that with a light aircraft, however sturdy and air-worthy they might be, and actually, is it really worth it?

Lady Bailey passed through here on the 8th inst. on her way to Paris.

On Tuesday, the aerodrome presented a rather unusual appearance, by the visit of an L.G.O.C. omnibus with a load of twenty drivers and conductors, all in full dress uniform. Whether it was their annual beanfeast one does not know, but they were welcomed by Mr. Montague, Under Secretary of State for Air; Mr. Bertram, Deputy Director of Civil Aviation, and the Air Ministry officers attached to the aerodrome. They were escorted round the aerodrome and afterwards took a flight over London in an Imperial Airways Argosy, piloted by Mr. Olley. They followed their own bus route, on the flight, and seemed very much impressed by their experience. Whatever the event represented, it was of sufficient importance to bring down half of Fleet Street and the majority of the "noise canning" experts complete with the apparatus necessary for the "canning" process.

On Thursday, some very fast outward trips were made of course, the gales being responsible. The "Subenci" Fokker made "London—Brussels" in 80 minutes, and an Imperial Argosy made "London—Paris" in 107 minutes. Several other equally fast trips were made by the various companies' machines. Incoming traffic needless to say, suffered some prolonged trips, and were arriving up to an hour late.

On Friday, Messrs. Muir and Birkett both made "air dashes" to Plymouth and back for the press, to collect photographs of Malcolm Campbell's triumph at Daytona.

I understand that Mrs. Victor Bruce is expected at Croydon on the 20th inst., and is likely to be given an official welcome, arranged by Auto Auctions, Ltd.

On Saturday, the famous German General, during the late war, "Prince Rupprecht of Bavaria," travelled from here by the Luft Hansa line. One was much impressed by his kindly looks, and he strikes one as being quite a pleasant personage in spite of his reputed war record.

The Robinson "Redwing" has left on an extended tour of the country and will, I believe, be away some three weeks. Mr. Robinson hopes to arrive back with his pockets bulging with orders, and we certainly wish him luck as he has produced an excellent little machine.

Also, on Saturday, we witnessed the arrival of a French ladies "Ice Hockey team." They do not look so athletic as our own countrywomen, who take up sports, but, perhaps, one had better leave it at that.

Joyriding has had a slight burst of popularity this last few days and no doubt will soon be at its height. It is obviously a purely seasonal pastime and one where the summer rush has to pay for the winter slackness.

The American "Aeronca" of Lieut.-Col. Darby's has been out of its incubator for an airing, and was piloted by Mr. Thorn, of A.D.C. Aircraft. This machine can certainly be claimed a light aircraft, although I do not think it will make much appeal in this country.

The traffic figures for the past week were:

Passengers, 271. Freight, 30 tons.

P. B.



**NEW D.C.A. AT HESTON:** Col. Shelmerdine, Director of Civil Aviation, paid his first official visit to Heston Air Park last week. Our group includes, from left to right, General Caddell of Vickers, Mr. Nigel Norman of Heston, Mr. P. D. Acland of Vickers, Col. Shelmerdine, Col. C. Russell, President of the Dublin Aero Club, Mr. Summers, Vickers' test pilot, and Col. W. Caldwell of the Irving Air Chute Company. (FLIGHT Photo.)

# PRIVATE FLYING AND CLUB NEWS

## THE LIVERPOOL AND DISTRICT

**AERO CLUB** are increasing their activities in several directions. They now have two instructors, Mr. Geoffrey Clapham who for many years was test pilot with the Sopwith Aviation Company and latterly has been instructor to the Brazilian Air Force at La Paz and also flying for a German commercial aviation company, and both he and Mr. Higgins, the second instructor, are making a determined effort to show people in the north that flying at clubs is going to develop into a big thing. During January the weather conditions were bad and flying was only possible on 14 days. In view of this the total time of 75 hr. 25 min. was not so bad. This total was divided into 38 hr. 35 min. solo flying and 36 hr. 45 min. dual. Two members, namely, Mr. P. Oversby and Mr. H. S. Robson passed the tests for their "A" licences. The club now operates on three aerodromes. Hooton is of course the home aerodrome and flying is carried out every day except Monday, when the club is closed. At Southport there is flying on the shore three days a week and at Speke, the Liverpool municipal aerodrome across the river, also on three days a week, and a machine is available at any time at this latter aerodrome at ten minutes' notice being given, providing that the ten minutes' flying time from Hooton to Speke is paid for. The club's annual dance will be held at the Grosvenor Hotel, Chester, on March 6, when Sir Charles Wakefield and Lady Bailey have promised their support. The success of this seems assured, as Flt. Lt. N. Comper is the Chairman of the dance committee.

## THE NEWCASTLE AERO

**CLUB** is organising an open handicap race from Heston to Cramlington on June 6. This will be for the "Evening World" Trophy. There will be no restriction on the type of aircraft or to the pilot, whether professional or amateur. The race is scheduled to start about noon from Heston, the remainder following according to their handicap. The finish is expected to take place at Newcastle



**A MACHINE WHICH LIVES UP TO ITS NAME:** The latest Comper Swift (50 h.p. Salmson), a fast handy little one-seater and the property of Mr. Gordon Selfridge. Selfridge's, it may be of interest to note, have ordered eight Comper Swifts—two with Salmson engines and six with the new Pobjoy engine. (FLIGHT Photo.)



## CINQUE PORTS FLYING

**CLUB.**—All the flying for the week ending February 14, took place on the afternoon of Sunday, the 8th instant. During the whole of the rest of the week, either the weather, or the fact that Mr. K. K. Brown, the club instructor, was suffering from a touch of influenza, rendered all club flying impossible.

The total flying for the week was therefore only 3 hr. 35 min., made up as follows:—Dual instruction (two members), 45 min.; advanced dual (three members), 1 hr.; "A" pilots (three members), 1 hr. 30 min.; tests, etc., 30 min.

## A NEW Private Owners List.

Our readers may be interested to know that we have just published a new list of Private Owners and their Aircraft. This now gives information regarding 312 owners and 349 machines, which was the state of affairs up to January 31 last. Copies of this list may be obtained from our Publishers, price 4d. post free.



**A "FLY-WEIGHT" MACHINE:** Mr. S. A. Thorn ready to take off in Col. Ormonde Darby's Aeronca. Centre photograph shows the little American Aeronca—or "Flying Wigwam"—flying at Croydon. (FLIGHT Photos.)



# GLIDING

**DORSET Gliding Club.**—The Dance given by the Dorset Gliding Club in the Town Hall, Yeovil, on February 6, was a great success, some 120 members and friends took part and proved that the gliding exercises had kept them in good form for dancing.

A special menu had been prepared, giving some entirely new names to the various refreshments. Some of these names would no doubt shock Mrs. Beeton, but at any rate, they were of considerable gliding interest. The refreshments had been prepared by lady members of the Club, and it is hoped that by their efforts the Club Funds will be considerably augmented.

Saturday being a very nice day, quite a number of members turned up on the Aerodrome for the first meeting of the season. Everyone seemed to be feeling the effect of the night before, but the sight of "Freddy" (the Club R.F.D.) emerging from the hangar looking very fresh and full of life after a good overhaul, cheered everyone up, and a good afternoon's gliding was put in, 22 launches in all being made without a mishap. Everyone said that the machine seemed to handle better since its overhaul and minor improvements.

No flying took place on Sunday owing to bad weather, although one or two super-enthusiastic members turned up.

**THE SOUTHDOWN Skysailing Club.**—After forced idleness for two Sundays, owing to local foot and mouth disease restrictions, the club met at 10.30 on February 8 at Newmarket Farm near Falmer. The finding of this very fine ground is due to the energy and foresight of Captain Leroy Brown, while the Club is also very much indebted to Mr. G. Woodman, for allowing them to house their machine in his barn and to fly on his land, as also to Mr. Ray for a like privilege.

Although all flying members were notified of the change of ground, only about 30 per cent. turned out.

Our R.F.D. was moved to its new quarters on Saturday, so that there was no time wasted on Sunday morning. For this we have to thank our ground engineers, Messrs. S. Wood and Ely, and one of our keenest pilots, Mr. C. King-Smith and others.

Sunday opened with a strong, steady, S.W. wind, very suitable to the site chosen for the day's work, and as we believe in going ahead slowly and carefully, we started on the simplest among many variable and interesting launching points.

Mr. Russell made the usual test flight passing our R.F.D. O.K. This machine has now had over 300 launches, which figure speaks well for the quality of the machine, and for the care and repair work of our riggers.

Mr. Lawson twice gave us demonstrations of steady and safe gliding and spoke, as did we all, very enthusiastically of the quality of the air in its freedom from eddies, &c., the new ground being very much better than the old one under similar conditions.

The day's labour was made very light by the enterprise of Messrs. King-Smith and Lawford, the one supplying a Trojan car and the other a pair of tractor wheels for it. This combination gave excellent service all day.

Messrs. Cannon and Tully continue to show great promise, but Mr. Tully lacks confidence in his own ability.

The break in the continuity of training has had an adverse effect on some of those who have to think how to handle the controls as against those who do these things instinctively.

Will all interested please note that Mr. York Bramble has resigned his secretaryship of the club?

**THE SOUTHAMPTON Gliding Club.**—Meetings are now held weekly at Bassett, through kind permission of Mr. W. C. Browning, and all the members are receiving instruction, some having made flights. They are all very satisfied with the "Dickson" machine, and pay tribute to its sound construction.

The club is fortunate in having a number of members from the local aircraft firms, who give their services willingly, to keep the machine in flying trim.

On Monday, February 2, the club took advantage of the full moon, and held a very successful night meeting, a number of members making flights.

The subscription to this club is 30s. per annum, with an entrance fee of 10s.; further particulars may be had from the hon. secretary, 14, Cumberland Place, Southampton.

**WESTLAND AIRCRAFT SOCIETY.**—Over a hundred comprised the audience at a lecture on the subject of the "Design, Development and Construction of Sailplanes and Gliders," which was delivered under the aegis of the Westland Aircraft Society at The Three Choughs Hotel, Yeovil, on Monday, February 2.

The lecturer was Herr Lippisch, who is responsible for the design of many of the most successful German gliders, and has built remarkable tailless types. More familiar to most is his sailplane, the Wien, the type demonstrated by Herr Kronfeld at Eggardon, Dorset, last year, at an exhibition arranged by the Dorset Gliding Club.

The lecturer was introduced by Mr. R. A. Bruce, and by means of slides the various air currents and the development of design of gliders was illustrated. To enable pilots to take fullest advantage of these, varying designs were explained in detail by drawings accompanied by photographs.

Passing to actual construction, slides showing various methods were projected and explained.

Reference was then made to the construction of tailless types of aircraft, the lecturer paying tribute to the work carried out in England by Capt. G. T. R. Hill.

Views of the Wasserkuppe, the centre of gliding activities in Germany, situated in the Rhön mountains, were shown. In one view, as many as eight different types of gliders and sailplanes were in the air at one time.

Herr Lippisch caused much laughter by referring to the seasons of the year as "three-quarters winter, the other quarter being bad weather."

Mr. Bruce said the lecture had been very interesting, and that gratitude should be expressed to Herr Lippisch for coming to Yeovil to give to members of the Westland Aircraft Society first-hand information on this subject—and invited members to put any questions they desired.

Questions by Capt. A. S. Keep, Mr. A. Davenport, and others, were answered at length by the lecturer, and further explained by blackboard illustrations.

Invited by Mr. Bruce to propose a vote of thanks, Capt. Hill said he would first like to express his appreciation of the extreme kindness shown to Mrs. Hill and himself during a recent visit to the Wasserkuppe. Everywhere he found courtesy and the construction work he saw was beautiful. Referring to the withdrawal of nails from the work, Capt. Hill emphasised the fact that the nails used were of steel, and were picked up and hammered in by magnetised hammers, thus saving time in the operation and lessening risk of injury to the hands. He wished, he said in conclusion, to thank Herr Lippisch for so kindly coming to lecture.

Replying, Herr Lippisch said that gliding was an art, and emphasised that by studying and using air currents it was possible to make a long flight without the necessity of constant refuelling, as in the case of light, power-driven aircraft.

Among others present were Capt. R. C. Petter and Mr. R. J. Norton and members visited from Bristol and Gloucester Branches of the Royal Aeronautical Society. Many members of the Dorset Gliding Club were present, and afterwards availed themselves of the opportunity to obtain the advice of Herr Lippisch on many technical matters.

**A DEMONSTRATION OF AUTO TOWING.**—Gliding was held on Saturday and Sunday, February 7 and 8, at Hooton Park for members of the Liverpool and District Aero Club. Mr. Lowe-Wylde had taken his BAC 6 up there and a large number of successful flights were made. On Sunday afternoon there was a wind of some 20 miles per hour blowing and four club members were able to qualify for their "A" gliding licences. These were Mr. Davidson with 32 secs., Mr. Moulds with 58½ sec., Sqd.-Ldr. Williamson with 52½ sec., and Mr. Fresson with 45 sec. All these were obtained within one hour, which would point to the fact we ourselves stressed recently, that this method of gliding appears to offer a quick means of preliminary training for soaring or power driven flight. We would however again like to stress that it must be carried out only under expert and very strict supervision by an instructor in the car who knows the business from A—Z. It is proposed to form a gliding section of the Liverpool Aero Club shortly with an annual subscription of £3 3s. This would also include full

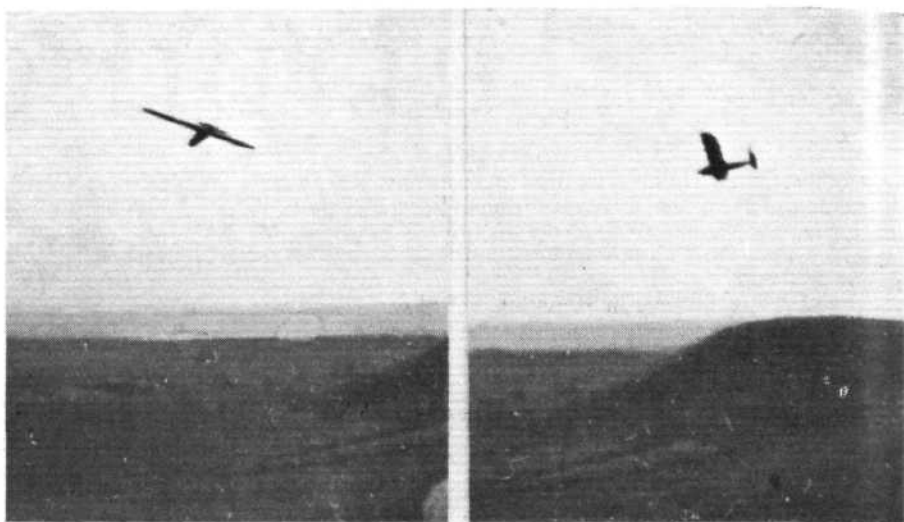
associate membership of the Liverpool Aero Club. It is also expected that Sqd.-Ldr. Williamson who is the general instructor to No. 5 F.T.S., R.A.F., at Sealand, will be able to form a gliding club there.

**THE SURREY GLIDING CLUB** have moved from Chilworth to a larger ground at Stocks Farm, Meonstoke, which is on the southern slope of Old Winchester Hill. Flying will be carried out on this ground with both their Dagling and Prüfling machines every Sunday (weather permitting) commencing at 10 a.m.

**LONDON Gliding Club.**—The last three week-ends have seen a considerable amount of activity within the club, and a large number of instructional flights have been made, with the result that a fresh crop of "A's" is expected shortly. The Prüfling has been in the wars once again, as a cow got loose on the farm where it is stored and decided to make its bed on one of the wings. The club constructional section was called into action, and put in a particularly fine piece of work by starting repairs at 9 p.m. and completing the job by 7 a.m. the next morning. They then retired to bed, and awoke to find totally inadequate wind for soaring. Last week-end, February 14 and 15, was one of considerable activity, and on Saturday the Zögling was hard at work. Sunday the 15th was an excellent day, and three machines—the Zögling, Prüfling, and the Scud—were all in operation. The event of the day was the Scud, which has been undergoing careful trial for the last three week-ends and was given its first opportunity to soar. Mr. Mole took it off from the top of the ridge and soared for 1 hr. 2 min. The machine appeared exceptionally controllable, and reached a height of about 500 ft. This is, we believe, the first real soaring flight to be made on an all-British machine since 1922, and it is interesting to note that both its designer, Mr. L. E. Baynes, and its pilot, Mr. Mole, are members of the club. The average wind speed for the day was 14 m.p.h.

Capt. Needham then soared the Prüfling for about four minutes, but landed to leave the course clear for the Scud. This is the first occasion when two club members have been soaring at the same time. After the Scud had landed, Mr. Williams took off in the Prüfling and made an excellent flight of 11 min. 4 sec., which was the final qualifying flight for his "B" certificate. Several other shorter flights were also made on the Prüfling. This machine has recently been equipped with an especially low-reading air-speed indicator, manufactured by Smith's Instruments, Ltd., and reading from 10-50 m.p.h., and so far it would appear that the best soaring speed is about 28-30 m.p.h., and landing speed about 18-20 m.p.h.

On Friday, January 30, the club gave an informal dinner



Two views of the Baynes "Scud" making its one-hour flight at Dunstable.

of welcome to Herr Lippisch at the Holborn Restaurant, at which he was presented with a club badge and an honorary life membership of the club. The first annual general meeting of the club will be held in the library of the Royal Aeronautical Society at 6.30 p.m. on Wednesday, February 25. There are still some vacancies in the instructional group, and those interested should write to the Secretary, The London Gliding Club, Empire House, St. Martin's-le-Grand, London, E.C.1.

**THE LEEDS Gliding Club** had a very good day at Weeton, on February 15, every member present having a number of flights. Mr. Thompson started the day well with a very fine 40-sec. flight, whilst Messrs. Wallis, Richardson, Stedman and Jefferson got some really nice glides. The strong gusty wind called for care on the part of the "lesser-lights," but the day ended with Reynard II "whole," and everyone very satisfied.

It was an interesting meeting, four machines being present, viz.:—the Harrogate Dickson, Bradford's Dickson, Mr. Sutton's new Airedale, and the club's Reynard. The star turn of the day was, of course, Mr. Addyman, of Harrogate, who made some Kronfeld-like flights around the hill on the H. A. G. Dickson. Mr. Verity (Bradford) demonstrated the Airedale, which is an "all Yorkshire" machine that will take a lot of beating.

The club is busy rebuilding a wing and fuselage at the Leeds workshop, for the Reynard I, and also two or three members are building soarplanes. Mr. W. G. Adam's soarer is rapidly taking shape, whilst rudders, wing-ribs, etc., hang from every wall of the Hon. Secretary's home. It is hoped to have these two machines ready for May.

The team for the Harrogate competition, on February 22, will be as follows:—Messrs. C. W. Richardson, A. G. Wilson, Wallis, G. Jefferson, Thompson, Stedman, Gomersall and Adams.

**THE BRITISH GLIDING ASSOCIATION** announce that National Flying Services, Ltd. have placed at their disposal the aerodrome of the Yorkshire Light Aeroplane Club at Sherburn-in-Elmet (near Leeds) on Saturday afternoon and Sunday next, February 21 and 22, for a further series of demonstrations and experiments of Towed Gliding.

Members of the Association and affiliated Clubs are invited to attend and visitors will be made honorary members of the Club for the day.



Mr. I. Mole (left) who put up a flight of 1 hr. 2 min. on the "Scud" Intermediate glider which was designed by Mr. L. E. Baynes (right).





# AIR TRANSPORT

## SIR ERIC GEDDES ON THE FUTURE\*

(Concluded from p. 144)

### Economic Results of Air Transport

SIR ERIC GEDDES then continued by stating that it was true that, with two or three exceptions, there was no commercial air transport in the world which could fly by itself, unassisted by some form of subsidy. Sir Eric mentioned the exceptions, which will already be known to readers of FLIGHT, *i.e.*, the services in Colombia and New Guinea.

Usually, the best surface-travel facilities existed where traffic was most dense, but under such conditions air transport had to compete with low rates of rail and sea transport.

If they took the cost of operation as 100, the traffic earnings of the air services operated by several of the European countries represented

France	..	..	..	20
Germany	..	..	..	33
Great Britain	..	..	..	47

For the preceding year, Great Britain's figure was 63, but the inauguration of the England-India service caused a temporary reduction. Holland reached a figure of 64 for one year, but the inauguration of the Amsterdam-Batavia service would cause the ratio of traffic earnings to decrease.

### Cost of Operation

Continuing with the assumption that the total cost of operation was 100, this total could be sub-divided as follows:—

				Components of Air Transport Costs.	
Labour—					
Technical	..	..	..	19	
Commercial	..	..	..	6	
Charges incidental to labour	..	..	..	4	
				—	29
Fuel and oil	..	..	..	..	16
Obsolescence and depreciation	..	..	..	..	17
Materials	..	..	..	..	15
Insurance and accidents	..	..	..	..	5
Overhead charges, advertising and administration	..	..	..	..	18
					100

For traffic receipts to balance expenditure, changes must occur somewhere. The industry was roughly half-way there now, and Sir Eric proceeded to examine ways and means of making up the other half.

Under the heading Labour, he did not look to any fall in the general wage level, but rather to improvements in design and construction, and to the reduction in the maintenance and repair costs.

The items Fuel and Oil were not, Sir Eric thought, likely to be materially reduced in cost, and they were commodities which were very sensitive to the laws of supply and demand. There was the possibility of heavy-oil fuel replacing petrol, and although the heavy-oil engine could not yet give the same results as the refined petrol engine, he thought they would see remarkable improvements during the next five years.

In dealing with Obsolescence and Depreciation, the lecturer pointed out that depreciation concerned plant and equipment, etc., but did not refer to aircraft and engines, the wear and tear on which were taken care of daily in maintenance. Very large sums had, however, to be set aside for obsolescence, and it was under this heading that they would find one of the greatest benefits from the progress of aeronautical science. Present-day costs were inflated because, for example, Imperial Airways fleet was written off every four years. This policy gave rapid replacement of units with aircraft of the latest design, and they were thus able to take advantage of the modern improvements in design and construction. This, however, was an artificial cost which could not be afforded were it not for the subsidy. Similar conditions prevailed in most countries, and Sir Eric

pointed out that one American company provided for obsolescence at the rate of 50 per cent. per annum. "Given two air services," Sir Eric said, "one planning its fleet replacements every ten years, and the other enabled, by means of a subsidy, to replace its fleet every three or four years," it was obvious that the latter would outstep the former in knowledge and experience of operations, in the performance of its fleet, and, he ventured to believe, in all the attributes which make for commercial success. They also had to look for a decrease in the initial cost of aircraft and engines. Their cost to-day was weighted with the burden of experimental and design costs, and overhead expenses spread over a limited output.

Sir Eric did not look forward to any fall in the prices of material, but thought relief would come in the durability of components by the use of metal construction.

Insurance provided one of the most encouraging signs of progress. Seven years ago, insurance and accidents represented 11 per cent. of Imperial Airways' budget. The figure had now fallen to 5 per cent. There was room for improvement, but he thought Imperial Airways' rates were lower than those obtained by any other air service. As a fair premium, they could take, as an average figure, 7½ per cent. per annum on the cost of the fleet.

All other classes of charge could be grouped under the heading Overheads. In the air line he was considering, they were spread over an annual mileage of about 1½ million miles, flown by aircraft of an average load of about 1½ tons, of which roughly 60 per cent. was filled with paying traffic. If these overheads, and the important items of obsolescence and insurance, were to be spread over double the mileage, or over the same mileage with double the pay-load capacity, the budget would show a very different picture.

Imperial Airways had always operated aircraft of a larger capacity than commonly used elsewhere, but in spite of this they had attained higher load factors. They had offered more space, and had sold a larger percentage of it. It would be unwise to estimate for an average of more than about 60 per cent., and there was ground for believing that if the capacity of aircraft was increased to three or four times what it was to-day, the load factor would come down lower, to, say, 40 to 50 per cent. This was a circumstance which could partly be controlled by the size of aircraft employed.

Outlining savings which might reasonably be expected, and expressing these as part of the original cost of operation which was taken as 100, Sir Eric said that by aiming for a reduction in the productive part of technical labour costs a saving to about 3 per cent. might be expected. The use of heavy-oil fuel might be expected to give a reduction to 8 per cent., while an obsolescence spread over ten years, instead of four, should give a saving of 9 per cent. The increased durability of materials should decrease this item of cost by about 25 per cent., or reduce it to 4 per cent., while an insurance rate of about the same as for first-class shipping would give a reduction to 2 per cent. Altogether a total saving of 26 per cent. The position of the hypothetical air line after it had achieved these savings would be: cost, 74 per cent.; revenue, 50 per cent.; deficit, 24 per cent.

It was thus clear, Sir Eric said, that these possible economies alone would not enable the air line to change from a minus to a plus result, and this brought him to the two fundamental improvements which they expected on the one hand from the designers and constructors of aircraft, and on the other, from the men whose duty it was to create a greater demand for air travel.

He had shown how the designer ten years ago gave them a pay-load capacity of 1 lb. per h.p. The figure to-day was about 3.1 lb. per h.p., and he asked whether they would be setting too hard a task for the scientist if they asked him to give 5 lb. per h.p. paying load on a similar fuel range basis. He admitted the task was hard, but did not think it was insuperable. The latest type of machine being commissioned would give a pay-load of about 3½ lb. per h.p., so that they were working up to the 5 lb. for which he asked, although 5 was but a stepping stone to 6 and 7 lb. per h.p.

The effect of increasing the capacity was very marked. Thus if an increase in pay load was obtained, giving them

\* Summary of Paper read before the Marshall Society of Cambridge on February 5.



5 lb. per h.p. instead of 3.1, the revenue of the hypothetical air line would increase from 50 to about 75. Already the budget was about balancing, and they had not yet considered the effect of increasing the volume of flying operations. As aircraft and engines were developed, so less time would be spent on the ground for maintenance and overhaul, and therefore more time would be available for flying. This, together with the development of night flying, would permit a greater number of miles per year to be flown. Economic success depended very largely upon keeping the units in operation. An aircraft must fly up to 200,000 miles a year in the future to achieve success.

To obtain this increased performance by speed alone increased the relative cost, and to attempt to get it by drawing upon the resources of the human element would weaken the fundamental desire for safety. To obtain this increased performance by so simplifying designs that less work was necessary and less time spent on the ground meant real economy and advancement. If the mileage flown were increased by half and sufficient traffic was available to give remunerative loads for the extra miles, the loss on the subsidised operations would be turned into a profit. If one doubled the original mileage the profits increased, because air transport was not inherently uneconomic. It already earned a gross profit on its prime cost of operation, and the need was for more and more flights, so that accumulation of gross profits, coupled with such economies as were possible, would first equal and then pass the total of the overhead expenses. This was a problem which was faced to-day by industries many years older than air transport.

There was still a great deal to be done in fostering the spirit of air-mindedness and in telling the men and women of to-day what it really meant to our Empire to have India a week instead of two weeks away, South Africa only eleven days, Egypt as near as a long week-end, and later Australia a week and a half away instead of nearly a month.

### The Transition Period and Subsidies

The next part of Sir Eric Geddes' paper dealt with the transition period until commercial aviation could exist as a profitable industry. If it were not for the subsidies paid to operating companies throughout the world, the rate of progress would suffer a severe deceleration. Subsidies were paid to accelerate progress, to bring to pass in ten years or so what might otherwise take 100 years or more to develop. Subsidies, Sir Eric said, are a medium through which we can buy the future.

The various countries had different forms of subsidy. In France liberal subsidies were paid and the object of thereby creating potential military reserves was openly admitted. There was no military air force in Germany, and all the wealth of aeronautical talent and large sums of money were devoted to the development of commercial aviation. Great Britain had aimed at placing air transport on a self-supporting basis at the earliest time possible, assisting it with the minimum subsidy necessary to tide it over the early years. In America, no direct subsidies were paid, but by way of indirect subsidy the American Government had awarded air mail contracts which made it necessary for the Post Department to write off a heavy loss each year on its air mail contracts. In Czechoslovakia, the State operated its own air service, and in India a start had been made by following the same policy, the Karachi-Delhi weekly service being controlled by the Government of India, although as a temporary arrangement the aircraft and technical personnel were chartered from Imperial Airways.

Sir Eric then gave the following figures of cost to the taxpayer of air services:—

	Cost to the State per traffic ton mile.	
	s.	d.
United States, 1929	..	8 1
Germany, 1928	..	8 8
France, 1928	..	15 8
Great Britain, 1929—	..	..
European services	..	3 4
All services	..	7 2

The table showed that Great Britain was getting better value for money spent on civil aviation subsidies than the other large nations.

For some years yet subsidies must continue to be paid. There would always be transport services running to certain places which could not hope to pay. In the British Empire there were many mail boat services to outlying parts which could never pay, and which were possible only because of grants paid by the Governments. They could not hope to achieve in air transport "payability" on services where sea transport, with its hundreds of years' experience, had failed. But there were other air services between centres of industry which would, he believed, reach or nearly approach "payability" during the next decade.

### Conclusion

Concluding his very interesting lecture, Sir Eric Geddes said: "I have urged for simplicity in aircraft and engine design and construction, and now I press for simplicity in the staggering number of laws, rules and regulations which present one of the most serious obstacles to the progress of air transport. Here we must not cross a frontier after dark, there we must deviate a hundred miles because we must not operate unless we call at a certain town, or we must not operate more than once weekly, and so the irritating restrictions and the insecurity of tenure which many of them impart hinder development.

"Would that the legislators of the world had the far-sightedness of their forefathers, and declared the airways of the world as free as its seaways.

"I urge, too, for simplicity in the organisation of the Empire airways. We have considered how extension of operations is essential for economic success, but there are still those who believe that a long-distance route, such as England to Australia, can be run by a series of independent organisations. The India section run by an Indian concern the Burmese section by a local Burmese line, and so on; a complicated and expensive series of local organisations, with fleet capacity and performance decided locally, with replacement plans out of step and with duplication of overhead expenses, and reserves both of material and money.

"Unified control and management of technical and commercial policies is essential. We must have one simple organisation in control of an arterial airway instead of a number of disunited local lines. Divided control has never worked, and never will work.

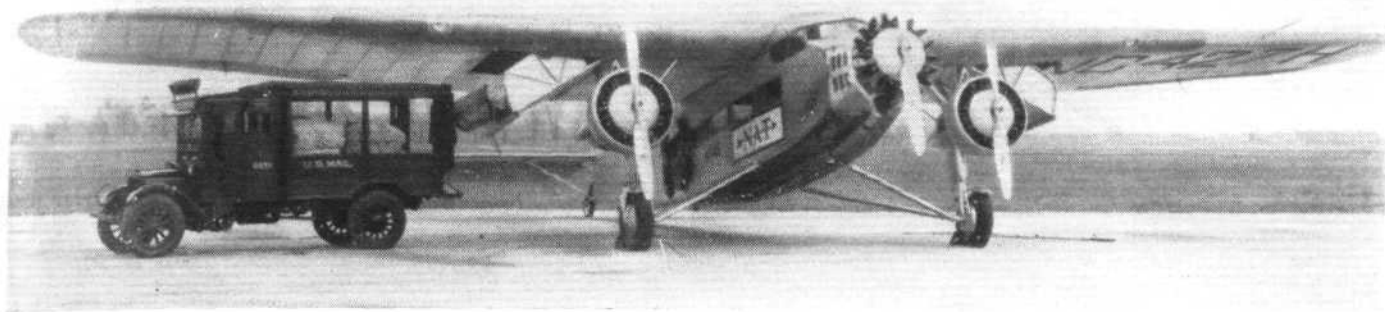
"Air transport commenced with one great advantage. It is the first transport medium for which extensive scientific research preceded actual operations. With the ship, the train, and the car, their use as transport vehicles ran concurrently with the study of their science. The scientist worked alongside and sometimes behind the practical man, and perhaps experience proved a better master than theory in some respects, but in air transport there were many years of study before the aeroplane came to be used as a commercial conveyance. The years after an aeroplane first flew were years of research, of many trials and many errors, and the development was aided and accelerated by the years of war.

"It is as well it was so. The surface transport systems had a midway course. If the early railway engines could not achieve the speed for which the designers had aimed, then the engines merely operated to a slower schedule. The motor-car which failed to hold the road at speed merely went slower at a safer speed.

"There is not the same midway course in aviation. "This difference in the evolution of air transport may explain in part the enormous relative progress of air transport in just over ten years compared to the stage of development reached by the earlier systems after they had experience of only a decade of operation.

"And still we must take no chances. Every step and change must be planned to the finest degree. The micrometer is our measure—the first ships were gauged by the span.

"When one reflects on the remote areas of the world where men are brought nearer to civilisation and the comforts of life by the use of aircraft; when one realises the eager interest with which the arrival of the air mail is awaited in many parts of the world and in particular of the British Empire, this diminishing of space seems a worthy aim. An aim which the twentieth century can fulfil, and I believe that in so doing they may give back to our Empire some of the prosperity that our forefathers left to us as the legacy of the nineteenth century."



## A FORD FEATURE

### A Neat Method of Stowing Mails

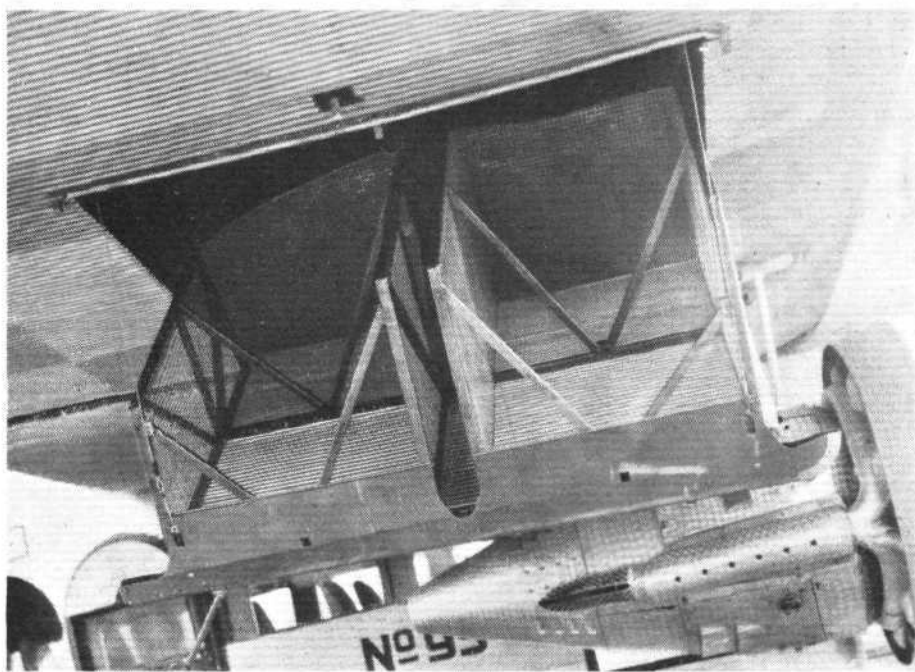
**W**E have already published a detailed description of the Ford three-engine air liner (see *FLIGHT*, November 14, 1930), and this week we are able to supplement this with some particulars of a very neat feature recently embodied in these machines.

This feature concerns the stowing of mails, or other baggage, which, as may be seen from the accompanying illustrations, consists of a "disappearing" wing compartment located in the wing on the side of each outboard engine. The floor of this compartment is actually a portion of the under surface of the wing arranged to form a sort of hinged tray which is raised or lowered by a cranking device.

When lowered it is an easy matter to place the mail bags in place and then raise the tray, which is secured in position by a simple locking device that ensures all danger of the compartment coming loose while the aircraft is in flight. Unloading the mails or baggage is equally convenient and quick. This is clearly indicated in our central illustration.

Each compartment has a capacity of 600 lb. or 1,200 lb. in all, and apart from the facility of loading or unloading, this arrangement has the advantage of avoiding any inconvenience to the passengers in the cabin.

The top illustration shows one of the three-engined Ford airliners, employed by National Air Transport (Inc.) of America, with the ingenious wing mail compartments. How the mails are placed in these compartments is shown in the centre picture, while the lower picture shows an interior view of the compartment.



### Night Air Routes in America

It is reported from Washington that the Bill providing for the night-lighted air routes of the United States will sanction an expenditure of \$10,000,000 (£2,000,000) a year.

### Edinburgh Airport

A SUB-COMMITTEE of the Edinburgh Town Council is considering a proposal for a municipal airport for Edinburgh. Two sites in the area between Granton and Cramond have been examined, and the proximity of the Forth should also make this area suitable for seaplanes as well as land 'planes.

### Sheffield's Municipal Airport

It is reported that Coal Aston has been chosen as the site for the Sheffield Municipal Aerodrome. Coal Aston

was first established as an air station during the war, the Government having constructed roads, hangars and huts on the spot. A good deal of demolition has already taken place, but enough still remains to provide the nucleus for an airport. A greater part of the land already belongs to the municipality.

### Mercantile Air Service Badges

IMPERIAL AIRWAYS announce that in future officers of their Mercantile Air Service will be distinguished by badges analogous to those of the Mercantile Marine. In the case of pilots in command of air liners, two  $\frac{1}{2}$ -in. gold bands will be given on the sleeves of their blue uniforms.



# AIRISMS FROM THE FOUR WINDS

## The Princes' Flight in Peru

THE Prince of Wales and Prince George left Lima, the capital of Peru, by aeroplane on February 15 for Arequipa, some 500 miles to the south-east and high up in the Andes. They flew in a three-engined machine piloted by Mr. Homer Farris of the Pan-American Grace Airways, which also carried a second pilot and a crew of two. Four aeroplanes of the Peruvian army escorted the Royal machine, and two of them accompanied it to Ica, 200 miles south of Lima. There another escort took over and flew with the Princes to Arequipa, which was reached after a flight of 4½ hours. The flight passed over magnificent scenery, as the route ran parallel to the main chain of the Andes. Arequipa itself stands near the foot of the volcano El Misti, which has not been active for two centuries. After attending a party, the Princes left by special train for Cuzco, which was reached on the following afternoon.

## R.A.F. Cape Flight

THE three "Victorias" of No. 216 (Bomber) Squadron started from Capetown on their return flight to Cairo on Wednesday, February 11. As we go to press, the latest information is that they left Pietersburg on February 18 for Bulawayo.

## The R.A.F. Flight to Basra

THE three "Rangoon" flying boats of No. 203 (F.B.) Squadron, which are flying out to Basra, after being delayed at Plymouth for a week by bad weather, started off again on Saturday, February 14. At noon on Wednesday, February 18, they were sighted flying over Corsica.

## The Flight to the Cape

FLT.-LT. TOMMY ROSE who, as reported in last week's issue, is carrying out a lightning business trip to Cape Town on the Anglo-American Oil Co.'s Avro Avian, reached Rome on Feb. 11—that is, on the same day he left Lympe. Next day he flew to Tripoli and on the next to Bengazi.

From here he proceeded, on Feb. 14, to Cairo, and after a two hours' stop continued on his way. He reached Khartoum on Feb. 15 and the next day set out for Juba, Kenya.

## Another England—Australia Flight

MR. C. W. A. SCOTT, the well-known Qantas pilot—who is also instructor to the Queensland Aero Club—is planning an attack on the England—Australia air record about the middle of March next. He has purchased a special D.H. "Puss Moth" for the purpose.

## Lord Balfour of Burleigh Flying in Africa

LORD BALFOUR OF BURLEIGH, who is a Director of the Standard Bank of South Africa, is making an aerial tour of the various branches of the bank in Africa. Recently, accompanied by Mr. W. K. Robinson, general manager of the bank, he flew from Johannesburg to Windhoek, and thence to East London, a distance of over 1,000 miles, in 13 hr., with only two stops for refuelling.

## Lady Bailey's Mediterranean Flight

ON February 12, Lady Bailey flew across the Mediterranean from Marseilles to Tunis in just over five hours.

## R.A.F. Display at New Delhi

THE festivities which marked the official opening of New Delhi ended with a display by the Royal Air Force on February 14 at the Safdar Jang aerodrome, before a crowd estimated at 100,000. Some 80 aeroplanes took part in the display, which was graced by the presence of H.E. the Viceroy and of the ex-Viceroy, Lord Harding. The proceeds of the display are being devoted to the R.A.F. Memorial Fund. The items included a fight between a "Hinai" night bomber, which took part in the evacuation of Kabul two years ago, and Bristol Fighters. Aircraft were seen dropping supplies to infantry, as was actually carried out not long before on the Chitral relief. There were aerobatics and the laying of a smoke screen, and an imposing display of



**LOAD-TESTING THE "PUSS MOTH":** These two photographs show a "Puss Moth" wing being loaded up with shot and, in the upper picture, supporting a load of 4,530 lb. A few seconds after this photograph was taken the wing collapsed. The factor required is 5½, and this was actually slightly exceeded. (FLIGHT Photographs.)



formation flying by squadrons of Wapitis, as well as parachute drops. A very popular item was an aerobatic performance by three Indian pilots in "Moths," Messrs. Chawla, B. and P. D. Sharma, all members of the Delhi Flying Club.

#### Spotted Fever at Uxbridge

BOTH the Army and the Air Force have been afflicted in places by attacks of spotted fever. In the R.A.F. the outbreak has been confined to recruits stationed at Uxbridge. The recruits' block has been isolated.

#### Aircraft in the New Zealand Earthquake Area

THE de Havilland Aircraft Co., Ltd., have received a cable from their Auckland representative stating that a fleet of "amateur wireless" Moths and Puss Moths had established regular communication with the devastated areas, over mountainous country and under unfavourable conditions, carrying medical supplies, doctors, telegrams and mails. Five Moths also transported a million-gallon chlorinating plant.

The High Commissioner for New Zealand, Sir Thomas Wilford, has received a telegram from the Prime Minister of the Dominion, Mr. Forbes, which, among other things, stated:—An official from the Magnetic Observatory at Christchurch reports, after aerial survey, that a series of landslips, some of which are of immense size, has occurred along the coast from Cape Kidnappers to Waikare, and that the largest landslip was a mile long and half a mile broad.

#### Death of M. Darracq

M. ALEXANDRE DARRACQ, the famous pioneer constructor of motor-cars and aero engines, died at his villa in Monte Carlo on February 11.

#### R 101 Wall Tablet Design

THE Council of the Royal Society of Arts are offering a prize of £10 for a design for a bronze wall tablet to commemorate the loss of R 101. The tablet is to be suitable for placing in the principal vestibule of an Air Ministry.

#### Japanese-built Airship Flies

A 36-HOUR endurance test was carried out in Japan on February 13 with the naval airship which has been built in Japan.

#### The French Schneider Team

THE British United Press reports from Marseilles that the veteran civilian pilot, M. Sadi Lecoq, once the holder of world air-speed records, will lead the French Schneider Trophy team. It is added, and we give it for what it is worth, that he will pilot a Nieuport seaplane fitted with two 1,400-h.p. engines placed in tandem. Another member of the team, M. Paillard, is mentioned as having attained a speed of 274 m.p.h. in a Bernard seaplane with 1,200-h.p. engine. It will be surprising if the French team does not prove to be composed of service pilots, though M. Sadi Lecoq, who must be rather old for high-speed flying, may well be a sort of technical superintendent of the team. A few days ago the *Times* correspondent at Marseilles reported that 12 pilots, mostly of the naval air service, have gone into training for the Schneider contest.

#### (Flairs, Please!)

ON February 11 a party of 20 drivers and conductors from the Holloway Road garage of the London General

Omnibus Co. paid a visit to Croydon Aerodrome, where they were received by Mr. Montague, Under-Secretary for Air. The party, which was organised by Mr. G. Godwin, a conductor, in addition to inspecting the various items of interest at the airport, went for a flight over London in an Imperial Airways air-liner. Mr. Godwin stated that they were very keen on flying, and did not see why they should not have a light aeroplane club of their own—they already had a gliding club.

#### 10 Squadron, R.F.C. and R.A.F., Re-Union Dinner

THE Fourth Annual Re-Union Dinner of 10 Squadron (R.F.C. and R.A.F., 1914-1919), will be held at Ye Old Pindar of Wakefield, Gray's Inn Road, on Saturday, March 14, 1931. Tickets, 5s. 6d., can be obtained from A. F. Williams, Rozel, Rickmansworth Road, Amersham, Bucks. This successful re-union dinner, which is attended by all ranks, hopes this year to have a record gathering. Major K. D. P. Murray, M.C., late Commanding Officer of the Squadron, will attend.

#### Capt. Malcolm Campbell's Record

It is rumoured that America is likely to attack the wonderful land speed record, recently put up by Capt. Malcolm Campbell on his Napier-engined car, which was fitted with Dunlop tyres and wheels. Our U.S.A. friends will have something to shout about if they accomplish their desires.

#### Spartan Aircraft Cross the Solent

WE are informed that at midnight yesterday Spartan Aircraft, Ltd., crossed the Solent from Southampton to East Cowes, Isle of Wight, where henceforth they will be located. Telephone is now Cowes 193, Extension 23, and Telegrams, Spartan, Cowes.

#### R.A.F. Officer Acquitted at Court Martial

PILOT-OFFICER D. V. ANGELL, of No. 29 Fighter Squadron, North Weald, was found not guilty of neglect of flying by a court martial on February 17. The case concerned a collision on January 12, when it was alleged that Angell's "Siskin" struck the tail of Flying-Officer Lemon's machine. The tail of the latter machine broke off, and F.O. Lemon was killed. P.O. Angell pleaded not guilty. Wing-Comdr. R. G. D. Small said that the regulation about distance between machines flying in formation was very seldom carried out. It was much easier to fly in tight formation than at the correct intervals and distances. According to evidence, both machines got into bumps near a hangar. P.O. Angell, in his evidence, said that he could not control his machine in the bump. He was not aware that there had been any impact until he landed. His machine was less than half a span away from the other. The court acquitted Angell after a brief retirement.

#### Aviation in Chile

CHILE expects soon to have the largest air force in South America. It is estimated that there are approximately 150 military and commercial planes in Chile now, and 60 more have been ordered. These latter will be constructed in Santiago by an American firm. Chile's entire aviation programme is in charge of the new air ministry, headed by a "sub-secretary of aviation," and forming a new unit of the ministry of the interior. All control of military aviation has been taken from the army and navy and placed in the hands of the new air chief. Commercial aviation also is under his command.

## SOME IRVIN AIRCHUTE STATISTICS

A RECORD number of Royal Air Force lives were saved by parachutes in 1930. The total, 24, exceeds the 1929 record by five, and is far in excess of every year's total since 1925, when parachute equipment was issued to the R.A.F. The accidents concerned with last year's escapes were of the following nature: Collisions (5), structural failures (7), engine troubles (3), errors of judgment by the pilots (3), other causes (1).

Most of the collisions occurred during air fighting practice, and if a lesson can be derived from a study of these it is that when a pilot loses sight of his adversary in a mock fight at close quarters he should avoid the climbing turn to improve his angle of view. The safest course is to fly straight out of the fighting zone on an even keel until the foe is sighted again.

All the structural failures happened when pilots were stunting, and chiefly applied to controls. Two of the three accidents caused by engine troubles began with crankshafts breaking, leading to the engines vibrating out of their bearings and upsetting the balance of the aircraft. The third accident was due to fire, and probably it should be attributed to the petrol system rather than the engine.

A Flight Cadet came out of a cloud inverted and decided to jump, while a Flying Officer chose the same method of

escape rather than risk a landing in thick fog. A Pilot Officer escaped twice within three months, and an Air Force padre became the first member of his profession to survive the parachute experience. Five of the 24 adventures occurred in Iraq alone. There is no record of a parachute failing but a few pilots were killed by jumping too late after bravely striving to save their damaged aircraft. A young air gunner in Iraq took control of the machine when his pilot was flung out in a collision, and landed down wind with engine full on. The machine turned over with a terrific crash, but he had a wonderful escape. His pilot alighted safely by parachute. One pilot was struck by his spinning machine as he fell and had his left arm broken, but he opened his parachute without difficulty. When a fighting biplane caught fire at 2,000 feet the pilot remained in the cockpit until there was no danger of the falling machine striking aerodrome buildings. He escaped with a broken leg and severe burns. Several pilots were less than 300 feet from the ground when their parachutes opened, and nearly all the 24 had had no previous experience of parachuting. Each qualified for membership of the International Caterpillar Club by the method of his escape from death, bringing the strength of that exclusive club to over 360.

# CALCULATION OF AIRSCREW CHARACTERISTICS

In our issues of October 31 and November 7, we published an article on the Avro Long-range "Avian" on which Kingsford Smith flew from England to Australia in record time. The article was much appreciated by our readers, as our post-bag shows, but the method employed in calculating airscrew characteristics puzzled several readers. We therefore communicated with Mr. Roy Chadwick, chief designer to A. V. Roe & Co., Ltd., and he very kindly instructed the Avro Technical Department to get out for us an explanation of the method employed. The method is stated in the following article.—ED.

THE following notes have been compiled on the method employed in estimating the Airscrew Characteristics for the Long Range Avian. (FLIGHT, October 31 and November 7).

The characteristics obtained are based on empirical curves deduced from the model test results of R. & M.829.

A few notes have also been included to explain the application of the method to general routine investigations where, probably, an airscrew has not, at the time, been designed.

## Data Necessary

It is assumed that the full scale airscrew will satisfy the design conditions of forward speed and R.P.M. at top speed, and at the design height.

In a preliminary investigation the diameter is estimated by means of one of the many reliable formulæ available, viz., Dr. Watts' Nomogram. The face pitch can be taken as the advance per revolution under the design conditions.

$$\text{i.e. } P_f = \frac{V \times 5280}{60 \times \text{R.P.M.}} = \frac{88 \cdot V}{\text{R.P.M.}} \quad (1)$$

where  $P_f$  = Face pitch ft.,  $V$  = Forward speed m.p.h.

## The Experimental Mean Pitch

The experimental mean pitch is the advance per revolution where the thrust is zero.

For a normal design of airscrew the experimental mean pitch to diameter ratio can be expressed approximately as:—

$$P_c/D = 1 \cdot 05 \quad (P_f/D + 0 \cdot 16) \quad (2)$$

## The Torque Coefficient

The torque coefficient  $K_q$  is given by

$$K_q = \frac{550}{2 \cdot \pi \cdot \rho} \frac{P}{n^3} \frac{\rho_e}{\sigma} \frac{1}{D^5} \quad (3)$$

where  $P$  = B.H.P. of engine at G.L.

$n$  = Revolutions per second of airscrew.

$\rho$  = Standard ground level density = 0.002373.

$\sigma$  = Relative density at height.

$\rho_e$  = Engine power factor at height.

$D$  = Airscrew diameter in feet.

For a given type of airscrew the shape of the  $K_q$  curve is dependent only on the experimental mean pitch to diameter ratio.

For the purpose of generalising the shape of the curves a constant ( $Q_c$ ) is introduced for each airscrew, such that

$$\text{when } J_1 = \frac{V}{n P_e} = 0 \cdot 5 \quad \text{then } K_q Q_c = 1 \cdot 0$$

(See Bairstow's Applied Aerodynamics.)

The empirical relationship for the evaluation of  $K_q Q_c$  is as follows:—

$$K_q Q_c = 1 - E F \quad (4)$$

For  $E$  and  $F$  see Figs. 1 and 2.

By combining equations 3 and 4 the value of  $Q_c$ , which remains constant for any altitude or value of  $J_1$ , is given by

$$Q_c = \frac{1 - E F}{K_q} \quad (5)$$

The known value of  $K_q$  is at the design conditions of top speed and R.P.M.

For any other value of  $J_1$  5 is rearranged so that  $P/n^3$  can be extracted thus:—

$$\frac{P}{n^3} = \frac{1 - E F}{Q_c} \frac{\sigma}{\rho_e} \frac{2 \cdot \pi \cdot \rho}{550} D^5 \quad (6)$$

Taking the values of  $P$  and  $n$  from the power curve for the engine used (see Fig. 1 and table FLIGHT, November 7, 1930). See Fig. 6 for  $\sigma$  and  $\rho_e$ .

## The Thrust Coefficient

The thrust coefficient  $K_t$  is given by the well known formula:

$$K_t = \frac{550}{\rho} \frac{P}{n^2} \frac{\rho_e}{\sigma} \frac{1}{D^4} \quad (7)$$

The shape of the  $K_t$  curve does not vary considerably with  $P_e/D$  ratio and is expressed as a generalised curve which satisfies the conditions:—

$$K_t/T_c = 1 \cdot 0 \quad \text{when } J_1 = 0 \cdot 5 \quad \text{where } T_c = \text{constant.}$$

This curve is given in Fig. 3.

## Airscrew Efficiency

The airscrew efficiency in free air is given by

$$\eta_1 = [A - BC] J_1 \frac{K_t T_c}{K_q Q_c} \quad (8)$$

$A$ ,  $B$  and  $C$  being obtained from Figs. 4 and 5 and are empirical relationships.

## Slip Factor

The increase in drag of the parts of the aeroplane in the slip stream is proportioned to the square of the airspeed over the body, viz. (slipstream velocity)<sup>2</sup>

This increase in drag can be expressed as

$$(D_2 - D_1) = D_1 \left( \frac{V + v}{V} \right)^2 - 1 \quad (9)$$

Where  $D_1$  is the free air drag of parts in the airscrew disc area at speed  $V$  and  $D_2$  is the drag of the same parts in the airscrew slipstream at speed  $V + v$

$v$  is the increase in airspeed due to slip.

This increase in drag can also be expressed as a fraction of the free airspeed drag:—

$$\left( \frac{D_2 - D_1}{D_1} \right) = \left( \frac{V + v}{V} \right)^2 - 1 = \phi + 1 \cdot 5 - \sqrt{\phi + 2 \cdot 25}$$

$$\text{where } \phi = \frac{3}{\rho \cdot \sigma \cdot V^2} \frac{T_1}{9 \cdot \frac{\pi}{4} D^2} = \frac{1,810 \cdot T_1}{\sigma \cdot V^2 \cdot D^2} \quad (10)$$

$T$  = The free air airscrew thrust.

A close approximation to this over the working range is:—

$$\left( \frac{V + v}{V} \right)^2 - 1 = \frac{1265 T_1}{V \cdot \sigma \cdot D^2} \quad (11)$$

which is equivalent to saying that the loss of thrust due to the effect of the slipstream over the body is approximately a constant percentage of the thrust supplied by the airscrew over the flying range.

The "nett" thrust is the difference between the free air thrust and the increase in drag of the part in the airscrew disc area due to slip.

$T$ , the "nett" thrust is then given by

$$\text{"Nett" thrust} = T_1 - (D_2 - D_1)$$

Substituting for  $(D_2 - D_1)$  from 9 and 11.

$$\text{"T"} = T_1 - \frac{D_1 \times 1265 T_1}{V^2 \cdot \sigma \cdot D^2} \text{ approx.}$$

$$\begin{aligned} &= T_1 \left[ 1 - \frac{1265}{V^2 \cdot \sigma \cdot D^2} K_B \cdot h \cdot \rho \sigma S_w V^2 \right] \\ &= T_1 \left[ 1 - \frac{3 \cdot h \cdot K_B \cdot S_w}{D^2} \right] \quad (12) \end{aligned}$$

where  $h$  is obtained as follows

Estimate the free air drag of the parts in the disc area then

$$h = \frac{\text{Free air drag in disc area}}{\text{Total free air parasite drag of the aeroplane}}$$

$$\text{Note } K_B = \frac{\text{Total parasite drag}}{\rho \cdot \sigma \cdot S_w \cdot V^2}$$

Where  $S_w$  = Total wing area.

It is more convenient to combine the slip factor with the free air airscrew efficiency and obtain a "nett" efficiency

instead of first calculating the free air thrust horse power and multiplying by the slip factor. The result is the same, but an operation is saved in the routine work.

Combining 8 and 12. Nett efficiency =

$$= \left[ A - BC \right] \left[ 1 - \frac{3 \cdot h \cdot K_B \cdot S_{w^*}}{D^2} \right] J_1 \frac{K_f T_c}{K_q Q_c} \dots \dots (13)$$

For a particular airscrew and body combination

$$\left[ A - BC \right] \left[ 1 - \frac{3 \cdot h \cdot K_B \cdot S_{w^*}}{D^2} \right] \text{ is a constant.}$$

The thrust horse-power (T.H.P.) is obtained by multiplying the B.H.P. (P) by the nett efficiency. The whole of the calculations is for the purpose of obtaining the T.H.P. at various speeds.

### Full Throttle Characteristics

By the above method the only curves necessary, except for those given (Figs. 1, 2, 3, 4 and 5), are those connecting the B.H.P. and the R.P.M. of the engine (this is supplied by the engine makers) also the  $P/n^3$  and R.P.M. at the same altitude.

These curves can be used for any aircraft using that particular engine, and for any altitude by means of equation 6, where  $P/n^3$  always refers to ground level conditions.

Where the power curve (as in the case of a supercharged engine) is available only at the rated altitude "x" ft. equation 6 is replaced by

$$\frac{P}{n^3} \text{ at } x^1 = \frac{1 - EF}{Q_c} \frac{\sigma}{\rho_e} \times \left( \frac{\sigma}{\rho_e} \text{ at } x^1 \right) \frac{2\pi \cdot \rho \cdot D^5}{550} \dots \dots (14)$$

Knowing the R.P.M., the aeroplane speed is obtained from

$$V = \frac{J_1 \cdot P_c}{1.467 \cdot 60} \text{ R.P.M. m.p.h.} \dots \dots \dots (15)$$

The efficiency and thrust horse power available on full throttle are then obtained by means of 13.

### Cruising R.P.M. and B.H.P. (Engine Throttled)

At any given value of  $J_1$  the value of  $P/n^3$  is constant at the same altitude.

This means that the power absorbed by the airscrew is proportional to the cube of the rate of revolutions, the upper limit being placed on the revolutions by the maximum power the engine can supply.

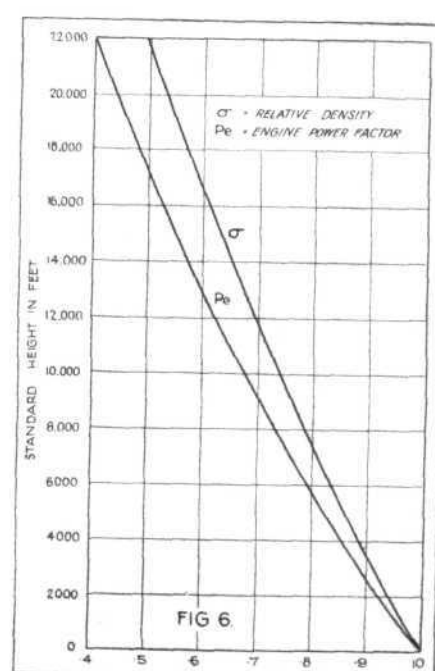
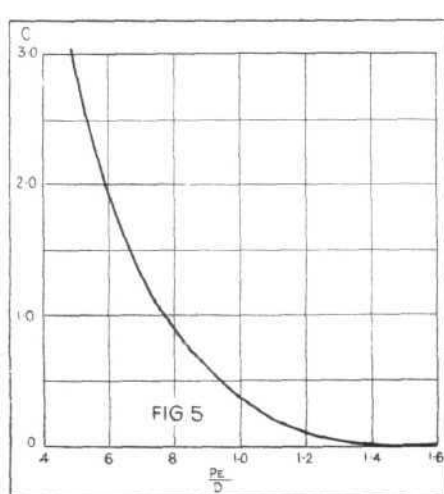
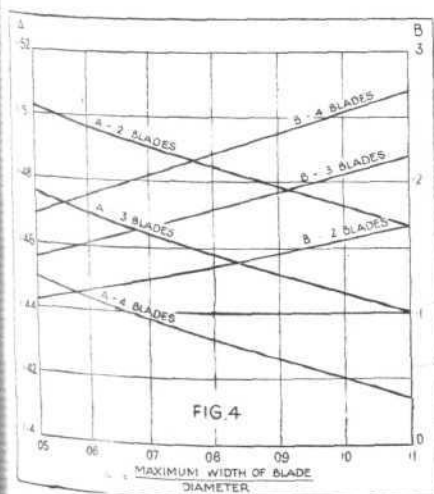
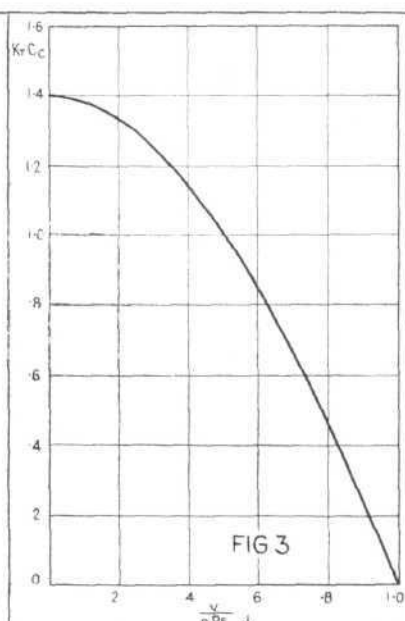
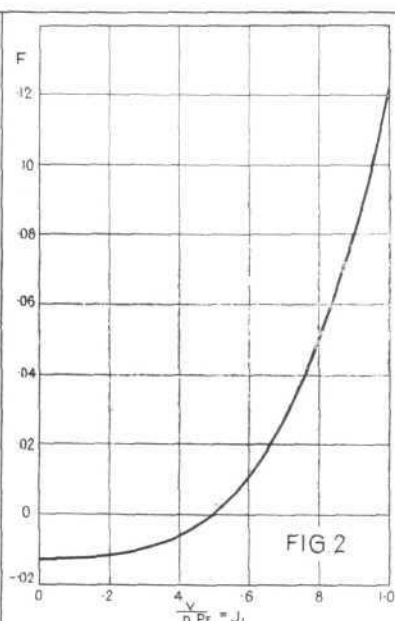
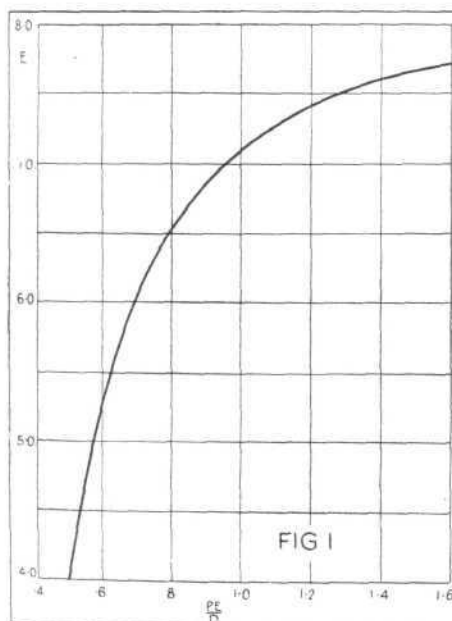
Starting with any value of  $J_1$  (say 0.4, 0.5 or 0.6) and corresponding  $P/n^3$  from equation 14, the B.H.P. for any R.P.M. can be obtained by multiplying the numerical value of  $P/n^3$  by  $n^3 = \text{revs./sec}^3$ .

A series of points can be obtained at various values of  $J_1$  and  $n$ , the corresponding aeroplane speeds being obtained by means of equation 15.

At any given value of  $J_1$  the efficiency is constant so that the thrust horse power is calculated in the usual manner as for the full throttle case.

In this way the constant R.P.M. curves for the long range Avian (FLIGHT, November 7, 1930, p. 1215, Fig. 3) were obtained. The points where the T.H.P. at constant R.P.M. and the curve of T.H.P. required for level flight cross, give the condition under which the aircraft is flying level.

If the aircraft is flying at any other point along these curves, it merely signifies that height is being gained or lost.



By this conversion from  $K_q Q_c$  to  $P/n^3$  and by means of the graph connecting  $P/n^3$  with R.P.M. and H.P. at rated altitude, the relationship between R.P.M. and H.P. at rated altitude and  $J_1$  is obtained by reading off the values of R.P.M. and H.P., corresponding to  $P/n^3$ , and multiplying H.P. by the appropriate  $\rho_e$  to bring to the altitude under consideration.

Fig. 6 shows variation of density and engine power with altitude.



## THE DESIGN OF SERVICE AEROPLANES

**M**R. C. R. FAIREY read a paper before the Royal United Service Institution, on February 11, with Air Vice-Marshall H. C. T. Dowding in the chair. The title of the paper was given as "The Future of Aeroplane Design for the Services," but Mr. Fairey said that he proposed to discuss rather some of the conditions governing the design of service machines. He dipped briefly into history, lauding the methods of the Air Department of the Admiralty and decrying those of the War Office and the Royal Aircraft Factory before the war. After the war, he said, things got somewhat rigid. Too many experts wished to introduce their own specialities into the design of an aeroplane. Specifications became formidable things. In 1921, when it was desired to find a replacement for the D.H.9A, the specifications asked for a speed less by 6 m.p.h. than that of the obsolete machine. The result was the "Fawn." At this period, the Air Ministry was not giving the designer a sufficiently free hand. Then he decided to design a machine based on the specifications for the "Fawn," and the result was the "Fox." He said that in that machine the designer had perhaps had too much of his own way. Still, it set a new standard for two-seaters, which was higher than the existing standard for the single-seaters. It was as a result of this, Mr. Fairey claimed, that modern specifications set performance of the machine above questions of defence and equipment. At present, a very happy liaison existed between the designer and the Air Ministry, and the latest successful compromise was the "Hart."

Mr. Fairey thought that it was now time that they had new rules about equipment and instruments. The machine gun had not advanced so fast as had the aeroplane and the engine. The makers of the machine gun seemed to expect it to jam in various ways, and the pilot must be able to clear all sorts of jams in impossible positions. If engine

designers regarded their valve gear thus, the aeroplane would not be a very useful weapon. Flying instruments, he thought, might also be improved.

Speaking of the recent introduction of metal aircraft, Mr. Fairey said that it tied a factory down to the one type for the construction of which it possessed the necessary tools. To change over to another type would be a slow and expensive affair. When aircraft were made of wood, they could be built in many sorts of works, but metal aircraft could only be made in a properly-equipped factory. In time of war, expansion of production would be a difficult affair.

This, he thought, would have a big effect upon design. A change to a new type would only be made when a big improvement could be effected. The new types would be developed more slowly, so that modifications would not have to be made after the machine had gone into production. Mass production was more applicable to small types, so the use of metal would tend to keep machines small. He prophesied that progress in the future would be by larger steps at longer intervals.

Mr. Fairey then amused his audience by showing a series of slides in which he converted the Supermarine Rolls Royce S.6, into an interceptor fighter, and the Fairey-Napier Long-Distance monoplane into a service bomber. After the conversion, he said that the speed of the S.6 would be 260 m.p.h., and it would be a bad fighter; while the monoplane, with 500 lb. of bombs, would have a range of only 3,100 miles. The originals were the products of unhampered designers without any liaison with the R.A.F. Those machines which had been produced by proper liaison were far more suitable for service use. He ventured to prophesy that in five years, the speed of single-seater fighters would be 250 m.p.h., and that of two-seater day-bombers 220 m.p.h.

## AIR MINISTRY NOTICES

### AIR MINISTRY NOTICES TO AIRMEN

#### Emergency Communication between Aircraft and Ships

1. In a recent accident involving the forced alighting and subsequent wreckage of a seaplane, a Fleet auxiliary vessel failed for a long time to realise that another aircraft flying low round her was endeavouring to call her by means of visual signalling to the assistance of the crew of the wrecked aircraft. The reason for the ship's failure to appreciate the situation was stated to be that "aircraft continually fly round ships," and, presumably, therefore, no special look-out for signals was considered necessary.

2. If an aircraft cannot communicate by W/T., message dropping and visual signalling are other means of attracting the attention of ships when conditions do not permit the aircraft to alight alongside. Message dropping, however, needs special apparatus, may be unreliable, and may even necessitate boat work.

3. It is suggested, therefore, that multi-seater aircraft when unable to communicate with ships by W/T. should use visual signalling. Aircraft wishing to communicate in this way for some urgent reason, such as calling attention to another aircraft in distress, should circle the ship, fire a succession of green Very lights, and then pass the signal.

4. Aircraft not fitted with means for visual signalling, and wishing to call attention to some other aircraft in distress, should do so by circling the ship, firing a succession of green Very lights, and then proceeding in the direction of the disabled aircraft.

5. Civil aircraft should not fly low round ships except for the purpose of passing an urgent message. The firing of the green Very lights will confirm that the communication following is a very urgent signal.

6. A Notice to Mariners has been issued to inform ships of the above procedure.

(Navigational Warning No. 3 of 1931.)

#### Examination for Air Navigators' Licences (Second Class)

1. An examination for 2nd Class Air Navigators' Licences will be held concurrently in—

Great Britain (London),

Egypt (Heliopolis, Heliopolis Aerodrome),

Iraq (Baghdad, Hinaidi Aerodrome),

on Monday, Tuesday and Wednesday, March 30 and 31 and April 1, 1931.

2. Application forms, the syllabus, and conditions of the examination may be obtained on application to the Secretary, Air Ministry (C.A.2), Gwydyr House, Whitehall, London, S.W.1, or to the British Directorate of Civil Aviation Representative in Egypt, Heliopolis Aerodrome, Heliopolis.

3. Formal applications to sit at this examination must be made on Form C.A.2c, and, together with the prescribed fees, must have been received at one of the above addresses not later than Monday, March 9, 1931.

(N.B.—Applications to sit in London should be sent to the Air Ministry and applications to sit in Heliopolis or Hinaidi should be sent to the Air Ministry Representative at Heliopolis.)

Candidates should give, with their formal applications, full details of any qualifications and experience they already possess.

4. Before a licence can be issued, candidates must pass the prescribed medical examination, for which special arrangements will be made where necessary.

5. Copies of the papers set at the six examinations for 2nd Class Licences held in October, 1930, July, 1930, March, 1930, October, 1929, December 1928, and April, 1928, bound in one cover, may be obtained on application to H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2, price 2s. net, or post free, price 2s. 4d. net.

6. A further examination for both 1st and 2nd Class navigators' licences will be held at or about the end of September, 1931.

(No. 4 of 1931.)

### AIR MINISTRY NOTICES TO AIRCRAFT OWNERS AND GROUND ENGINEERS

#### D.H. 80 A "Puss Moth" Aircraft : Main Planes and Ailerons

1. The makers of the above type of aircraft have introduced a modification which is considered very desirable as it precludes any possibility of aileron flutter even at speeds of 200 m.p.h. and over.

2. The modification consists of strengthening the attachment of the aileron false spar in accordance with drawing No. M.1560 and attaching an aileron balance-weight in accordance with drawing No. M.1561. The first part of this modification, with the exception of washer plate H.33753, will be found to be already incorporated in later aircraft.

3. The above drawings and the necessary parts may be obtained from the de Havilland Aircraft Co., Ltd., Stag Lane Aerodrome, Edgware, Middlesex.

4. The modification described above should be incorporated in all aircraft of the type referred to within three months from the date of this notice. No Certificate of airworthiness in respect of any such aircraft will be renewed until the modification has been satisfactorily incorporated.

(No. 18 of 1931.)

#### D.H. 80 A. "Puss-Moth" Aircraft : Attachment of Tail Skid

1. A MODIFICATION to the above-mentioned aircraft has been introduced by the constructors, the de Havilland Aircraft Co., Ltd. The Modification No. 169, consists of substituting an improved washer plate, Part No. H. 32275, for the original washer plate on the fin-post, which washer plate takes the top attachment of the tail skid. The original washer plate was flat and was made from 18 S.W.G. plate. The improved washer plate is made from 14 S.W.G. plate and has two  $\frac{1}{4}$ -in. flanges which fold round the sides of the fin post.

2. The introduction of the above modification is considered to be desirable in the case of all "Puss-Moth" aircraft in which it is not already incorporated. The Certificates of airworthiness of the earlier "Puss-Moth" aircraft were made valid for a maximum permissible all-up weight of 1,900 lb., but when the modification described above is incorporated the maximum all-up weight may be increased to 2,050 lb.

3. The necessary parts should be obtained from the de Havilland Aircraft Co., Ltd., Stag Lane Aerodrome, Edgware.

(No. 19 of 1931.)

### New Royal Air Force Appointments

THE Air Ministry announces the following appointments:—Air Vice-Marshall Felton Vesey Holt, C.M.G., D.S.O., now Director of Technical Development, Air Ministry, to be Air Officer Commanding, Fighting Area, Air Defence of Great

Britain, on or about March 31, 1931. Group Captain Henry Meyrick Cave-Browne-Cave, D.S.O., D.F.C., formerly Commanding Officer, Far East Command, to be Director of Technical Development, Air Ministry, in succession to Air Vice-Marshall Felton Vesey Holt, C.M.G., D.S.O.

# THE ROYAL AIR FORCE

London Gazette, February 10, 1931.

## General Duties Branch

Air Commodore C. S. Burnett, C.B., C.B.E., D.S.O., is appointed Director of Operations and Intelligence, Air Ministry, and Deputy Chief of the Air Staff, vice Air Vice-Marshal C. L. N. Newall, C.B., C.M.G., C.B.E., A.M. (Feb. 6); Air Vice-Marshal C. L. N. Newall, C.B., C.M.G., C.B.E., A.M., ceases to be an additional Member of the Air Council on relinquishing the appointment of Deputy Chief of the Air Staff (Feb. 6).

The follg. Pilot Officers, are promoted to rank of Flying Officer:—H. B. Robertson (Oct. 14, 1930); F. C. Cole, K. P. Lewis, A. O. Molesworth, S. S. Murray, C. A. Watt (Jan. 27). The follg. are placed on half-pay list, Scale B:—Flight Lt. H. R. D. Waghorn, A.F.C. (Jan. 30 to Feb. 3, inclusive); Pilot Officer R. L. Wallace (Feb. 9 to 13, inclusive); Pilot Officer L. W. C. Bower (Jan. 30 to Feb. 12, inclusive). Squadron Leader H. H. James, O.B.E., continues on half pay, Scale A, from Dec. 31, 1930, to Feb. 10, inclusive, and is placed on retired list on account of ill-health, with effect from Feb. 11. The follg. are placed on retired list on account of ill-health (Feb. 11):—Squadron Leader T. P. Y. Moore; Flying Officer P. C. I. Elderton. Pilot Officer A. T. Wilson resigns his short service commn. (Jan. 28).

## Stores Branch

Flying Officer E. F. Smith is placed on half-pay list, Scale B (Jan. 27 to Feb. 12, inclusive).

## Medical Branch

The short service commn. of Flying Officer G. W. Paton, M.B., Ch.B., is antedated to Oct. 2, 1927 (substituted for Gazette, June 3, 1930); the short

service commn. of Flying Officer P. J. McNally, M.B., B.Ch., is antedated to Aug. 12, 1928; Flying Officer G. W. Paton, M.B., Ch.B., is promoted to rank of Flight Lt. (Oct. 2, 1929) (substituted for Gazette, July 1, 1930); Flying Officer P. J. McNally, M.B., B.Ch., is promoted to rank of Flight Lt. (Aug. 12, 1930).

Erratum:—Gazette of Jan. 13 (FLIGHT, Jan. 23, 1931, p. 87), for F. B. C. Fundry, read F. B. C. Fundrey.

## RESERVE OF AIR FORCE OFFICERS

### General Duties Branch

The follg. Pilot Officers are promoted to rank of Flying Officer (Jan. 24):—C. G. Fraser, E. G. Curtice. The follg. Flying Officers relinquish their commns. on completion of service:—L. W. Beck (Sept. 12, 1930); R. G. Shaw (Oct. 5, 1930).

## AUXILIARY AIR FORCE

### General Duties Branch

No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON. The follg. to be Pilot Officers (Jan. 7): I. Kirkpatrick; E. H. Stevens.

### Chaplains Branch

No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON. The follg. to be Chaplain with the relative rank of Squadron Leader (Jan. 17):—The Rev. J. R. Brown.

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Force are notified:—

### General Duties Branch

Air Vice-Marshals: C. L. N. Newall, C.B., C.M.G., C.B.E., A.M., to H.Q. Wessex Bombing Area, Andover, on appointment as Air Officer Commanding, 6.2.31. Sir John M. Steel, K.B.E., C.B., C.M.G., to H.Q. R.A.F. India, pending taking over command, 6.2.31.

Air Commodore C. S. Burnett, C.B., C.B.E., D.S.O., to Air Ministry (D.O.I.) on appointment as Director and Deputy Chief of the Air Staff, 6.2.31.

Group Captains: G. R. Bromet, D.S.O., O.B.E., to H.Q. Coastal Area, for duty as Chief Staff Officer, 31.1.31. A. J. Miley, O.B.E., to Marine Aircraft Experimental Estab., Felixstowe, 31.1.31. W. L. Welsh, D.S.C., A.F.C., to No. 203 Sqn., Iraq, pending taking over command, 6.2.31.

Squadron-Leaders: R. C. Hardstaff, to No. 84 Sqn., Shaibah, 12.1.31. E. B. Rice, to H.Q. R.A.F. Transjordan and Palestine, Jerusalem, 15.12.30. R. L. Stevenson, M.B.E., to H.Q. Coastal Area, 9.2.31. A. S. G. Lee, M.C., to H.Q. Coastal Area, 4.2.31.

Flight-Lieutenants: R. W. G. Lywood, to R.A.F. Depot, Uxbridge, 18.1.31. H. Little, to R.A.F. Base, Gosport, 1.2.31. A. E. Paish, to No. 5 Flying Training Sch., Sealand, 2.2.31. L. K. Barnes, to No. 204 Sqn., Mount Batten, 5.2.31. H. R. D. Waghorn, A.F.C., to Half-pay List, 30.1.31. W. E. Dipple, to No. 2 (Indian Wing) Station, Risalpur, 18.1.31. C. J. Collingwood, to No. 2 (Indian Wing) Station, Risalpur, 1.3.31. F. G. Cator, to No. 8 Sqn., Aden, 28.1.31. H. A. Hamersley, M.C., R. L. Ragg, A.F.C., L. Dalton-Morris, all to No. 203 Sqn., Iraq, 6.2.31.

Flying Officers: A. H. Owen, to No. 15 Sqn., Martlesham Heath, 2.2.31. L. S. Snaith, to Marine Aircraft Experimental Estab., Felixstowe, 2.2.31. R. B. Council, to No. 203 Sqn., Iraq, 6.2.31. R. C. I. Pearce, to R.A.F. Base, Gosport, 1.2.31. P. H. Smith, to No. 3 Flying Training Sch., Grantham, 4.2.31. W. K. Beisiegel, to R.A.F. Depot, Uxbridge, 25.1.31.

## R.A.F. SPORT

### RUGBY FOOTBALL

#### R.A.F. v. Oxford University

The R.A.F. scored a very creditable win over Oxford on Wednesday, February 11, at Oxford, by a goal and a try (8 points) to a try (3 points). It was a bad day for football, owing to rain and wind. In the circumstances good passing among the backs could not be expected. Oxford scored first after the only good combined movement of the match, which sent Hoyde in for a try. Towards the end the R.A.F. forwards gained an advantage over the Varsity pack, and then P. O. McNicol and Corporal Christie scored tries from clever openings made by P. O. Bader. The teams were:—

Oxford University.—H. Rees (University College), back; P. C. Mimms (Balliol), T. M. Hart (Brasenose), V. G. Jenkins (Jesus), and F. L. Hoyde (Brasenose), three-quarter backs; W. Roberts (Brasenose) and N. K. Lampert (Balliol), half-backs; R. R. McGibbon (Corpus), H. M. Martin (Oriol), W. A. H. Druitt (Oriol), A. E. S. Charles (Worcester), W. E. Henley (New College), D. H. Swayne (Worcester), H. J. B. Hofmeyr (University College), and H. C. Burrow (Balliol), forwards.

Royal Air Force.—P. O. Ievers, back; P. O. L. R. White, Flight-Lieut. Holder, P. O. McNicol, and F. O. N. E. White, three-quarter backs; P. O. Bader and F. O. Maclean, half-backs; Flight Sergeant Kerby, Leading Aircraftman E. Simmons, Cpl. Christie, F. O. Constantine, F. O. Williams, F. O. Harren, Leading Aircraftman E. Gibbs, and Sergeant Hall, forwards.

### ASSOCIATION FOOTBALL

#### R.A.F. v. Civil Service

The R.A.F. beat the Civil Service at Uxbridge on Wednesday, February 11, by two goals to one. The R.A.F. were not at full strength, as seven or eight of their regular team were away, and A. C. Oates was killed in the flying-boat crash at Mount Batten. Nevertheless, they played very well, especially in the first half, when they had a strong wind and driving rain in their faces. A. C. Parrish scored the first goal for the R.A.F. Soon afterwards Williams put the Civil Service level. In the second half Vernon scored from a penalty kick. Several shots were missed by both sides. The teams were:—

Royal Air Force.—Aircraftman Chaston (Uxbridge), goal; Corporal Pond (Pond) and Sergeant James (Bicester), backs; Sergeant Trout (Wittering), Leading Aircraftman Hamlet (Calshot), and Aircraftman Bulman (Lee-on-Solent), half-backs; Aircraftman Hadley (Hawkinge), Aircraftman Parrish (Parrish), Leading Aircraftman Vernon (Halton), Leading Aircraftman Smith (Martlesham Heath), and Corporal Moffat (Halton), forwards.

Civil Service.—H. Flint, goal; H. H. Gower and R. E. Gibbs, backs; H. A. Pastow, S. Daniel, and R. Wolfenden, half-backs; F. E. Behn, C. H. Walsh, P. Williams, J. A. Ruston, and J. Casey, forwards.

## R.A.F. v. Army

## HOCKEY

The Army beat the R.A.F. in the first game of the Inter-Services Hockey Tournament at Uxbridge, on Wednesday, February 11, by two goals to love. It was a very good game, and the R.A.F. half-back line played particularly well. Lieut. Salew scored twice for the Army in the first half. In the second half the R.A.F. were continually on the aggressive, but the Army defence just held. The teams were:—

Royal Air Force.—Corporal C. Butler (Stanmore), goal; Sergeant N. Z. Foreman (North Weald) and Corporal L. G. Beeton (Henlow), backs; Leading Aircraftman L. R. Hobbs (Uxbridge), Sergeant W. C. Maher (Upavon), and P. O. N. Hill (Bircham Newton), half-backs; F. O. D. P. Lascelles (Sealand), F. O. E. A. J. Crummy (Worthy Down), F. O. H. E. Sales (Bicester), F. O. S. C. Bufton (Sealand), and Leading Aircraftman C. G. Stevenson (Henlow), forwards.

Army.—Lieut. D. R. Shaw (Royal Sussex Regiment), goal; Warrant Officer-Instructor W. A. Godfrey (Army Educational Corps) and Lieut. H. T. Heard (Royal Engineers), backs; Warrant Officer H. Cleland (Army Educational Corps), Lieut. T. H. Ely (King's Shropshire L.I.), and Capt. M. H. Cork (Army Educational Corps), half-backs; Lieut. W. M. Lillie (Royal Engineers), Capt. O. L. Roberts (Royal Engineers), Lieut. D. R. Salew (Essex Regiment), Lieut. W. C. Cook (Army Dental Corps), and Lieut. C. B. Fairbanks (Sherwood Foresters), forwards.

## Imperial Defence College.

The following officers have completed satisfactorily a course at the Imperial Defence College, which terminated on December 19, 1930:—Wing Commander R. M. Bayley, D.F.C., p.s.a.; Wing Commander N. H. Bottomley, A.F.C., p.s.a.; Squadron Leader R. M. Drummond, D.S.O., O.B.E., M.C., p.s.a.; Squadron Leader D. F. Stevenson, D.S.O., M.C., p.s.a.; Squadron Leader J. W. B. Grigson, D.S.O., D.F.C., p.s.a.

## Inter-Services Rugby Football Dance.

An inter-services Rugby football dance will be held at the Hyde Park Hotel on the night of the Royal Navy and Army match to be played on March 7, 1931. Applications for tickets (price 22s. 6d. each including supper and wines) should be made to the Secretary, R.A.F. Sports Board Room 840, Alexandra House, Kingsway, London, W.C.2, before March 4, after which date tickets will only be available at the door, price 25s. each. Remittances should accompany all applications.



## IN PARLIAMENT

## Flying-Boat Accident at Plymouth

MR. MONTAGUE, on February 9, in reply to Mr. Hore-Belisha, said: A Court of inquiry is now being assembled in respect of the disaster to the flying boat "Iris" at Plymouth, and I am not therefore, in a position to add anything to the information which has already been published. I am sure the House would wish me to take this opportunity of conveying publicly an expression of its deepest sympathy to the relatives of those who lost their lives in this most regrettable accident to one of our largest flying boats.

## Airship Works, Cardington Discharges

MR. MONTAGUE, on February 11, in reply to Mr. Wells, said the number of industrial employees dismissed from the Royal Airship Works at Cardington since the R. 101 disaster is 323 (222 men and 101 women); of these, 66 men were given notice prior to the disaster, and their dismissal was not a consequence of the loss of R. 101. The number at present employed at the Royal Airship Works is 385 (292 men and 93 women).

## Personnel Wastage

MR. MONTAGUE, in reply to Mr. Ayles, said the figures of the annual wastage of airmen in the Royal Air Force and the percentage they bear to the total strength for the years below are as follows:—

Year.	Wastage.	Percentage of Total Strength.
1926	3,307	11.16
1927	4,511	16.87
1928	2,187	8.06
1929	2,507	9.04
1930	2,153	7.54

## Meopham Flying Disaster

MR. MONTAGUE, on February 12, in reply to Capt. H. Balfour, said: The Secretary of State for Air has accepted the finding of the Sub-Committee of the Aeronautical Research Committee which investigated the accident to the Walcot air liner G-AAZK at Meopham, on July 21, 1930, which finding was approved by the Aeronautical Research Committee itself; and in all the circumstances he does not consider that any useful purpose would now be served by a public inquiry. The further investigations into the phenomenon of buffeting, which were recommended by the committee, are in progress at the National Physical Laboratory; and similar investigations are being carried out in Germany. Close touch is being kept with the German authorities on this point. Pending the result of these investigations, my noble friend has reserved his decision with reference to the continued validation of the certificates of airworthiness for the three aircraft of this type now in this country; but copies of the report of the Aeronautical Research Committee have been sent to the owners of these aircraft, and their attention has been specially drawn to the circumstances of the accident and to the Committee's finding as to its cause. I understand that the machines are not being used. The suggestion that a public inquiry was promised is not accepted by the Minister as a correct statement of fact.

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## MODELS

## THE MODEL AIRCRAFT CLUB. (T.M.A.C.)

**Competition Rules.**—All members are specially requested to keep a copy of the following competition rules which have been adopted in preference to other formulæ at present existing. The development of the club would be in accordance with the practice of the present-day aviation industry.

Before any competition is flown, all entrants will submit their models for examination by the stewards of the day, in order that points to the maximum value of 100 can be awarded in the following manner.

1. Design and construction (originality, progress, and workmanship); maximum award, 25 points.
2. Power (other than elastic); maximum award, 25 points.
3. Ability to R.O.G. (from suitable ground); maximum award, 25 points.
4. General stability (quality of flight, and gliding at the termination of flight); maximum award, 25 points.

During the competition flights, one extra point will be awarded for each second that the model is in the air unless conditions of the contest renders this impracticable, when extra points will be awarded as arranged by the particular contest in question.

## Inauguration of 1st Wing, T.M.A.C.

On Sunday, February 15, the inauguration meeting took place of 1st Wing, comprising Squadrons 1, 2 and 3. There are now four Wings organised in the London Area.

Owing to unforeseen circumstances, it was found necessary to hold the meeting at Parliament Hill, but in future 1st Wing should be operating from their own ground—Hampstead Heath Extension. Apologies are due to those visitors who were inconvenienced by the change of ground—their attendance at Parliament Hill was greatly appreciated.

The Organising Secretary, Mr. Yeomans, in presenting the Certificate of Inauguration to the Wing Commander, Mr. W. R. Burnett (Chairman T.M.A.C.), referred to the pleasures in store when Inter-Wing Contests can be held, and Mr. Burnett promised that his section would be "all out" to excel in these affairs.

A good flying display then took place. Various high and low wings, cabin planes, midgets and Gliders taking part. The buoyant air enabled some fine high flights to be accomplished. Models were flown by 1st Wing members, potential 2nd Wing members, who use Parliament Hill each Sunday, and a strong contingent of 4th Wing from Hackney Marsh.

Hon. Secretary, A. E. Jones, 48, Narcissus Road, West Hampstead, N.W.6.

## IMPORTS AND EXPORTS

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

For 1910 and 1911 figures see FLIGHT for January 25, 1912.

For 1912 and 1913, see FLIGHT for January 17, 1914.

For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1930 being given in FLIGHT, January 16, 1931.

	Imports.		Exports.		Re-exports.	
	1930.	1931.	1930.	1931.	1930.	1931.
Jan. ..	2,987	7,965	147,935	142,596	—	1,074

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## PUBLICATIONS RECEIVED

*Aeronautical Research Committee Reports and Memoranda*: No. 1315 (Ae. 470).—An Experimental Determination of the Intensity of Friction on the Surface of an Aerofoil. By A. Fage and V. M. Falkner. April, 1930. Price 1s. 3d. net. No. 1337 (Ae. 468).—The Stresses in a Radially-Spoked Wire Wheel Under Loads Applied to the Rim. Part II. Simplified Formulae and Curves. By Prof. A. J. Sutton Pippard and W. E. Francis. July, 1930. Price 9d. net. No. 1338 (Ae. 469).—Stalled Flight Tests on a Bristol Fighter Fitted with Auto Control Slots and Interceptors. By R. P. Alston and Pilots of Aerodynamics Flight, R.A.E. June, 1930. Price 4d. net. No. 1339 (Ae. 471).—Full-Scale Experiments on High Tip Speed Airscrews; The Effect of Thickness of Section on Airscrew Performance. By W. G. Jennings and A. Ormerod. August, 1930. Price 6d. net. No. 1340 (Ae. 472).—Directional Stability of High-Speed Aircraft. By W. G. Jennings. May, 1930. Price 6d. net. H.M. Stationery Office, Kingsway, London, W.C.2.

*Technical Report by the Accidents Investigation Sub-Committee on the Accident to the Aeroplane G-AAZK at Meopham, Kent, on July 21, 1930.* Aeronautical Research Committee Reports and Memoranda No. 1360. January, 1931. H.M. Stationery Office, Kingsway, London, W.C.2. Price 5s. 6d. net.

*Who's Who in British Aviation, 1931.* Airways Publications, Ltd., 6, Norfolk Street, Strand, W.C.2. Price 6s. net.

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## NEW COMPANIES REGISTERED

AIRSCREW COMPANY, LTD.—Capital, £15,000, in £1 shares.—Objects: Manufacturers of aircraft propellers, aircraft of all kinds, aircraft engines and parts, and components thereof, etc. Solicitors: Reynolds Sons and Gorst, 7, Arundel Street, W.C.2.

IONA NATIONAL AIRWAYS, LTD. (8,085).—Capital, £2,500, in £1 shares.—Manufacturers and repairers of and dealers in balloons, aeroplanes, hydroplanes and airships of all kinds, etc. First directors: H. Cahill, Prospect Villa, Glasnevin, Dublin. Mrs. Caroline Cahill, Prospect Villa, Glasnevin, Dublin.

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## AERONAUTICAL PATENT SPECIFICATIONS

(Abbreviations: Cyl. = cylinder; i.e. = internal combustion; m. = motor. The numbers in brackets are those under which the Specification will be printed and abridged; etc.)

## APPLIED FOR IN 1929

Published February 19, 1931

31,604. C. TÖPPER and F. TÖLKE. Aeroplane wings. (341,853.)

## APPLIED FOR IN 1930

Published February 19, 1931

1,986. SCHLEPPSCHRIFT-UDET GES. Displaying targets for anti-aircraft gun practice by means of aircraft. (342,116.)

## FLIGHT, The Aircraft Engineer and Airships.

36, GREAT QUEEN STREET, KINGSWAY, W.C.2.

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